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STATE INTEGRATED TOXICS MANAGEMENT:

FACT & CHALLENGE

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Integration (EPA/OTI) is interested in substantially strengthening federal-state cooperative mechanisms for the control and management of toxic substances. Designing a framework for federal-state cooperation and coordination depends heavily upon states' perspectives on their needs and potential roles. In cooperation with EPA/OTI.the National Governors' Association's Center for Policy Research undertook a three month review of state perspectives on overall hazardous materials management, focusing on toxic substances, to support the development of this federal-state cooperative strategy. NGA stresses the wide range of state accomplishments in this area. The report divides states into three groups along a set of qualities indicating their organization for toxics management and the sophistication of their approach. Different relationships with the Federal government, and different requirements for support, are indicated for each group. In general, the sophisticated states need program flexibility, those moderately involved need technical assistance, and the least advanced need information about the seriousness of the problem and workable models of improved systems.

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Foreword

We consider intergovernmental relationships a critical factor in our efforts to develop better alternatives for improved integration of EPA chemical regulatory programs. It was with that perspective that we initiated a project with the National Governor's Association to identify the States' perspectives on integrated toxic chemicals management -- their capabilities, needs, and constraints to effective management. This final report paints a picture of toxic chemical management issues as States see them, a picture that EPA is analyzing carefully as we seek to chart new roles in integrated toxics management. For States, this report should be a valuable reference on what other States are doing, as well as a tool for evaluating -- both independently and collectively -- their weaknesses and strengths. For all of us, the information becomes the blueprint for an even more cooperative, and responsive partnership.

Walter W. Kovalick Jr

Walter W. Kovalick, Jr.
Director
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I. EXECUTIVE SUMMARY & RECOMMENDATIONS

The broad and complex range of problems associated with dangerous substances has created one of the most serious public management problems in the United States today. For example, the generation of toxic substances is growing apace; however, knowledge of their hazard implications and management strategies are lagging. There is no clear nation-wide strategy to balance economic development with the protection of human health and the environment.

Knowledge of long-term health hazard implications is imprecise. Management programs at every level of the public and private sectors are generally uncoordinated and toxic chemical incidents of potentially crisis proportions have generated tremendous public fears.

States, which must safeguard public health and safety but also assure economic growth, are responsible for viable toxics management programs. Many are unsure, however, of just what is involved and would welcome guidance about how to proceed.

The Components of Integrated Toxics Management

State dangerous chemicals management programs risk piecemeal, fragmented development in reaction to varied federal authorities and concepts unless they encompass and address all of the following concerns:

- media: air, land, water, workplace;
- operations: production, processing, use and reuse, handling, transportation, distribution and sale, storage, disposal;
- products: raw chemicals, combined chemicals, by-products, waste;
- impacts: on human health and the environment - emissions (air), discharges (water), leaching (land), exposures (human body);
- hazards: toxicity (oral, dermal, inhalation), ignitability, corrosivity, reactivity, radioactivity, explosivity, irritability;
- management functions: of government and the private sector: writing and passing laws and regulations, monitoring, inspection, testing, sampling, investigation, enforcement, registration, licensing, permit issuance, certifying, funding, coordination, training, planning, information dissemination, emergency response, evaluation.

It should be emphasized that no one state program can or should encompass all these concerns; rather, they must be identified and/or established and effectively coordinated.

The concept of toxics integration incorporates four basic elements: 1) comprehensive management of all environmental concerns, 2) the use of toxics as a point of commonality among all media, operations, products, impacts, and management functions, 3) a preventative, mitigative philosophy with primary emphasis on human health, and 4) balancing economic and social costs with benefits of environmental control.

The benefits associated with toxics integration encompass: 1) cost savings through efficient coordination, 2) prevention of future harm, 3) promotion of coordination and cooperation within state government and among federal, state and local governments, and 4) eliminating present and future health effects information deficiencies.

General Findings

The Office of State Services of the National Governors' Association Center for Policy Research gathered information about the current status of state and territorial toxics management programs, to the extent they exist, as well as states' needs and problems, convened several meetings of governors' aides and toxics management personnel, and discussed toxics management with officials from most states and territories (excepting Northern Mariana Islands, North and South Dakota and Oregon).

It was found that twelve states have developed or are planning intrastate toxics integration programs and they have done so essentially on a trial and error basis. A mechanism is needed to share lessons learned among them and with states that are just beginning.

Other general findings of the NGA review were that:

- States appear to be concentrating their efforts on hazardous waste management more than on other types of hazardous substances management;
- TSCA legislation provides for no explicit substantive role for states, and most states do not see therein an implicit role that is not advocated by other federal environmental laws (e.g., CAA, FWPCA, RCRA, FIFRA);

- Many states believe they should have comprehensive, integrated hazardous substances management programs, as well as a stronger focus on toxics, but many don't know just where to start;
- States would welcome policy and management guidance briefings, organizational materials and more information on available support and, importantly, a single source to obtain valuable peer advice based on state level experience;
- The more experienced states would welcome a mechanism by which they may keep abreast of policies, legislation and management innovations of other states; and
- Due to individual state exigencies, state programs cannot and will not be uniform; however, all desire practical information and experienced-based advice as they organize their programs.

Specific Findings and Recommendations

The NGA review also produced a series of specific findings which suggest several ways in which orderly coordination may be approached.

Concepts and Terms: State government division heads working with various types of toxic substances know and interpret terms in various ways, often because federal programs do so. In order to coordinate effectively, managers and coordinators of overall toxic strategies must understand how relevant terms interrelate. EPA managers also need to understand this in dealing with various state offices. Commonly used concepts and terms demand mutually understood definitions because effective intergovernmental coordination depends on communication.

A taxonomy charting definitions, usages and linkages would be a useful tool for both federal and state toxics integration coordinators and managers.

State Organizational Needs: The NGA review team examined the general organization of states and territories as they deal with toxics in the air, land, water and workplace in terms of interoffice cooperation, health effects studies and monitoring; information gathering and communication, data retrieval and sharing and innovative programs.

It was found that states, generally, fall into three broad categories of organization and sophistication in toxics management, although each state is unique and some could fit two or three in terms of some of their activities. The states will be categorized in this report as "Group X," "Group Y" and "Group Z." The following general characteristics describe the three categories:

Group X States

- strong support for toxics integration from the governor;
- an integration strategy either functioning or under development;
- focus on toxics, pulling together interdepartmental programs, media operations, products, impacts, hazards and management functions, and integration of toxics concern throughout most environmental management activities;
- high priority on health effects studies, environmental epidemiology and toxicology, and continuous monitoring;
- emphasis on information gathering and sharing, inventorying critical materials for prioritizing and targeting investigative efforts, and comparatively high level of data computerization;

- relatively formal and organized communication and cooperation between various state agencies;
- creative management efforts based on strong individual programs and a long-term hazard prevention philosophy; and
- these states include: Arkansas, California, Illinois, Maryland, Michigan, New Jersey, New York, North Carolina, Oklahoma, Puerto Rico, Virginia and Wisconsin.

Group Y States

- mechanisms exist enabling future cross-agency, cross-media, cross-program integration for toxics;
- formal interagency cooperation for strong individual programs (usually in emergency response, transportation and/or hazardous waste), and ad hoc, informal cooperation on others;
- collection of industrial production information generally limited to hazardous waste generation and pesticide use data;
- formal or organized information sharing for strong individual programs and ad hoc on others; some computerization of data;
- interest in health effects studies and monitoring, recognition of the need for environmental epidemiology, although no real emphasis, some states have done isolated studies and preliminary research;
- federal enforcement responsibility for most environmental programs has been assumed, but more work needed to ensure they are firmly in place;
- some toxics control activities, but ad hoc attention in varied programs (for the most part, water-related programs exhibit stronger toxics concern); and
- states in this category include Arizona, Colorado, Connecticut, Delaware, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Minnesota, Montana, New Hampshire, Pennsylvania, Rhode Island, South Carolina, Texas, Utah, Vermont, Washington and Wyoming.

Group Z States

- generally fragmented management, although some states have strong hazardous materials emergency and/or hazardous waste programs;
- ad hoc cooperation and coordination for most environmental concerns ad hoc information sharing, with miscellaneous task forces organized for interagency work on narrowly defined issues (e.g. hazardous waste, siting);
- little information gathering on chemical production and use or little data computerization;
- many of the individual environmental programs are in formative stages except, generally, in pesticides and solid waste areas;
- little toxics focus in individual programs, although concern exists;
- these states and territories include: Alabama, Alaska, American Samoa, District of Columbia, Florida, Georgia, Guam, Hawaii, Idaho, Indiana, Maine, Mississippi, Missouri, Nebraska, Nevada, New Mexico, Ohio, Tennessee, West Virginia and the Virgin Islands.

It should be emphasized that the above categories are descriptive of current organizational state of the art in states, not prescriptive categories. It is also necessary to underscore that the categorical placements were made based on an initial summary review.

Depending on to whom the NGA review team talked in states, some respondents believe they are well coordinated, and others in the same state believe otherwise. All have varied conceptions about what toxics integration means, or should mean. It is therefore difficult to categorize them into X, Y, or Z groups. This was done, simply, to provide a broad focus from which management needs and strategies might be developed. It is also probable that in the short three month review period, some state strategies were missed. Looking at states' toxics programs in broad groups revealed that:

- X states appear to have developed toxic program thrusts in reaction to (1) severe toxic crises, (2) health research revealing high disease incidence or vulnerabilities rooted in environmental contamination, and (3) alarming environmental quality data generated by relatively sophisticated monitoring;
- In all three groups, environmental legislation has evolved or been spurred by (1) environmental crises or incidents and (2) federal legislative or regulatory requirements, although many states have had some level of environmental protection laws prior to the passage of federal legislation.

An in-depth analysis of these groupings, which appears in Section IV, illustrates interlinkages as well as contrasts between the three groups.

Y and Z States may wish to consider the extent to which they may want to emulate X States; however, they should not feel it necessary to do so. Many states cannot, and should not, establish programs found in X States, because they don't produce or handle large quantities of dangerous chemicals. The important thing is that all states consider the elements and potential benefits of toxics integration and develop appropriate mechanisms to establish integrated coordination, communication and cooperation to the extent needed.

Group X, Y and Z States have different needs because they are at different stages of development and have different priorities and problems. Group X States need review materials and tools to evaluate the effectiveness of their toxics strategies, as well as mechanisms by which they can share information with other states and gain added know-how for their own programs. They have a great deal of expertise to be shared with Y and Z States and are very willing to do so if a mechanism can be developed.

Group Y States represent a potentially fruitful target group as they seem to be ready to make productive use of toxics integration concepts, depending on their individually perceived needs. These states could benefit from technical assistance from the federal level and Group X States.

Group Z States need consciousness raising about their potential vulnerabilities and mechanisms to deal with them. To the extent that the federal government sees critical basic programs in which Z states should be involved, these states should be so advised.

All states would welcome succinct, well packaged materials on information sources as well as clearinghouse services; but materials and information must not be in such detail or perplexing amounts that states cannot use it. Also, states want materials geared to their individual needs and stage of development.

Interrelating mechanisms with appropriate tools and materials should be developed for each of the three groups. This can be done through federal-state cooperation in the following areas:

- continuous data gathering on state toxics management programs and integration;
- establishment of clearinghouse services for states, with lessons learned by states as its cornerstone;
- development of materials at different levels of expertise and complexity for state use, and their active dissemination;
- provision of management and advisory services between states and between federal and state governments;

- the provision of EPA Chemical Substances Information Network (CSIN) data to states in the most efficient, cost-effective manner possible geared to encourage states' widespread use and application of CSIN data; and
- the development and implementation of an annual national-regional-state toxics management conference to facilitate face-to-face information exchange and federal-state management improvements.

Need for State Management Tools: Managers must have mechanisms to be continuously informed about: risk implications; whether risks manifest themselves in the short or long-term; whether risks pose acute or chronic health problems of potentially crisis proportions, and at what point in time the crisis threshold will be reached. Managers must know what levels of government are involved or should be involved, and what management functions and tools are needed in order to manage the risks effectively. Information collection, organization of data, and analysis are the first steps in beginning to answer the unknown.

Tools should be developed to help state environmental managers better understand how their expertise, knowledge and activities interrelate. They must be designed in such a way as to illustrate the inter-relationships among terms, and activities of environmental, particularly toxics programs. They should be designed from a state perspective and reflect state needs.

Several states have developed interesting management tools (charts, management inventories for pinpointing gaps, overlaps and inconsistencies in activities, laws and practices, and other potential reference tools). These should be carefully reviewed and adapted to the extent possible for use by all states. Management tools developed from state materials with appropriate suggestions for usages would be welcomed by states. For example, the programs summarized in Section V of this report provide a great deal of raw material from which useful management tools could be developed and disseminated among states.

Existing federally-developed tools should also be reviewed, adapted, packaged, introduced and distributed to target states. For example, the EPA publication entitled Federal Activities in Toxic Substances provides a good reference tool for helping states understand what federal authorities exist for the regulation of toxics and in what ways those regulations are being implemented at the federal level. The publication, however, does not readily provide a clear picture of the links among the toxic control aspects of the various laws and programs. In addition, only the drinking water chapter lists which states have primacy for enforcement of federal requirements. It would be helpful for interstate reference to include in all program chapters a listing of states which have assumed primacy in enforcement of various federal authorities.

The EPA/state agreement process provides another tool for capturing under one cover the toxic aspects of state environmental programs. These agreements, however, describe only some of the environmental programs of a state, those for which the state is assuming federal responsibility. Actual linkages and specific activities or tasks that implement integration and toxics control techniquest on the operational level are usually glossed over, if mentioned at all. Information of this nature should be added in new agreements, or another procedure such as an information center established to capture, analyze, synthesize and share useful know-how.

In addition, the federal government has various lists of contaminants that are regulated such as a list of hazardous wastes, federally regulated surface and drinking water contaminants and so forth; however, the interrelationships of listed substances are not clear. A chart, or series of charts, would be useful so that state managers could see at a glance what substances are regulated per given medium or operation. Such a chart could prove useful in determining the pervasiveness of a particular chemical pollutant. A substance appearing on all regulatory lists, for example, would be an indication that it poses a danger at many points along the chemical life cycle requiring strict control action and an integrated regulatory approach. Such a chart could be used in conjunction with state chemical inventories for helping state environmental coordinators set broad goals and parameters for prioritizing substances for possible regulatory action beyond that currently required. Actual criteria standards would, of course, depend upon more specific technical reviews of volumes, concentrations and other factors.

Mechanisms or tasks for implementing integrated environmental management functions should be documented in an easy to read form so that states can choose from among a variety of methods for integrating program elements and instituting toxic control activities. States can learn from each other. In this report, we document some tools and mechanisms already in use. Development of a set of guidelines, perhaps a governor's guide on toxics integration, from materials already developed by states would be a useful tool. Further research on the effectiveness of current state strategies would provide "lessons learned" materials for interstate information exchanges.

States may not readily see the need or benefit of implementing a toxics integration management strategy. Case studies documenting advantages of having such a strategy would be useful illustrations for states that have not yet considered such an approach. Networking through continuous information exchanges by telephone and in writing between states and at the federal and state levels could foster the favorable climate needed for initiating integrated strategies and state-federal cooperation.

Work on toxics integration activities at the federal level must be encouraged every step of the way. The more integration at the federal level, the easier and more compelling it will be for the states to implement integration strategies.

Authorities: Both federal and state level environmental legislation and regulations appear to be fragmented, as most authorities were enacted in response to piecemeal, albeit critical needs. Such legislation is often patterned after federal authorities with special "cuts" according to states' needs. Federal funding and organizational requirements are often burdensome to states.

Only a few states want additional authority to control toxics; rather, they are searching for best ways to document and implement authorities. If any gaps exist, our review suggests they may be in information gathering authority needed to obtain data on chemical production and use, worker exposure and public health.

It would be useful to compile and analyze existing and pending state legislation on toxics management, and share findings among states. To the extent feasible, existing state "umbrella" legislation should be compared to "fragmented" authorities to determine and recommend improved options.

Role of the Governor: Most often, the governor becomes involved in toxics management when a crisis occurs or is looming. Governors are often caught between their responsibility to promote economic growth while protecting public health and the environment. This is often compounded by public outcry based on incomplete and often inflammatory information, making rational management difficult. Lacking long-term implications information, governors cannot plan responsible growth programs.

Governors need to (1) require continuous assessment of vulnerabilities, (2) institute continuous evaluation programs (3) coordinate and enhance economic development while protecting life and property, (4) establish policy and performance standards, and (5) require the implementation of systems using all available resources through comprehensive, affordable programs.

In order to do this, governors need organized tools and mechanisms to (1) know the management functions involved, (2) develop and integrate policy, (3) coordinate, monitor and evaluate functions continuously, and (4) update and change policy and programs according to needs and objective cost rationales.

A broad range of information and management initiatives is available and growing. When organized and maintained, it can provide a valuable resource to help states develop comprehensive toxics integration and management programs encompassing media, operations, products, impacts, hazards and management functions — in other words, effective management frameworks within which individual categorical programs such as epidemiology, waste siting, emergency response, storage, transport regulations, pesticides and many others can function in a more coordinated comprehensive environment.

A manual overviewing toxics management elements and benefits, current practices and organization and, importantly, suggesting management standards governors should require, questions to ask and methods to evaluate the state state of the art, would be useful.

Public Information and Participation: One of the major problems cited by states in controlling toxics is local political controversy over siting hazardous waste disposal facilities. Reports of chemically induced human health effects in a particular locality often lead to overreaction to stories about abandoned hazardous waste sites in other areas, and widespread public objection to plans for siting waste facilities in new areas. These fears also generate public concern over expansion of industrial chemical production complexes. The same is true for such crises as PCB contamination of livestock and pesticides ingestion (e.g., 2,4,-D, causing miscarriages).

This suggests a need for increased health effects monitoring and analysis by state and federal officials in order to assure the public that the most thorough, objective data have been utilized in the environmental decision-making process. In addition, more active programs, specifically designed to incorporate the public into the siting process, should reduce the amount of management problems associated with facility siting.

As most public information problems tend to occur after chemical accidents when public fear is raised about possible health effects, existing state public participation efforts tend to be reactive. More proactive programs involving the public and private sectors in addressing their perceived needs early on, should be instituted at the state and local levels, with industry and federal cooperation.

Broad, objective public information and participation programs are needed to establish a climate in which managers can act responsibly with informed public input and support. An integrated package of public information tools developed by government, industry and public organizations would be useful for public service broadcasting and use by chief executives. They can also provide useful background or source materials for the media, and encourage balanced news analysis and reporting.

Health Effects Monitoring & Studies: Activity here is primarily limited to Group X States. Environmental program managers and health authorities of Groups Y and Z States rarely communicate except in emergencies. Environmental disease and health effects data are imprecise, insufficient or non-existent; thus it is difficult to establish management criteria and regulations. State governments are usually reluctant to legislate or impose sanctions when unsure of their data on health consequences.

Many states would welcome assistance in environmental epidemiology and the development of systems to collect and share health data. EPA, in cooperation with the Center for Disease Control, state epidemologists or health authorities, should coordinate the exploration of:

- packaging and dissemination of currently available environmental disease data on a state-by-state basis;
- developing environmental epidemiological techniques as sophisticated as those we now have for communicable disease investigations; and
- instituting environmental epidemiological training at medical institutions and other facilities.

The Center for Disease Control and its national network of epidemiologists should be more broadly incorporated into all aspects of toxics integration management.

Scientific & Techncial Support: Most Y and Z States urgently need scientific and technical expertise and equipment for testing and sampling, especially for "exotics." They lack adequate funds for both salaries and equipment at the sophisticated level needed.

This problem might be remedied through multi-agency federal funding; cost-sharing between EPA and states; "circuit riding" consultants; regional lab enhancement and/or additional use and support of university facilities; and development of a constantly updated catalogue of federal and private funding sources which may be creatively used to meet these needs. Certainly, where expertise and equipment exist, it should be identified and shared to the extent possible.

Federal Management Assistance: In addition to the state and state-federal toxics management needs summarized above, specific program related services might well be considered by EPA's various program branches. These include:

- national and regional support for health effects studies and dissemination of objective health effects data;
- provision and placement for best use of chemical detection, testing and monitoring equipment, also trained, adequately compensated technicians;
- federal-industry funding of cleanup and mitigation programs;
- training programs for state technical and management personnel, based on state experience and inputs;
- technical assistance to states to catch up on laboratory backlogs through the provision of "circuit rider" technicians and experts;
- faster setting of standards for contamination levels of chemicals having widespread dangerous implications;
- national packaging and labelling procedures with minimal and flexible administrative requirements;

- encouragement of interstate and regional agreements on waste siting and disposal;
- continued national data bank development, integration and sharing of lessons learned among states, especially CSIN completion and on-line implementation;
- federal-state personnel exchange programs to facilitate increased understanding of points of view and expertise exchange;
- active federal-state efforts to simplify and make federal regulations as flexible as possible and reduce and integrate environmental reporting requirements;
- establishment of national precedents through litigation and subsequent court decisions that states may use to justify the need for state toxics controls. This can reduce multi-state depletions of technical, financial and time resources and costly duplication of work, and
- recognition of federal toxics management roles as seated in research, policy, standards setting, technical assistance, funding and support to states for national priorities; and of state roles in operations and procedural implementation of national policies and standards, as well as for area-specific chemicals concerns.

Summary

The need for integrated toxics management is upon us. As public concern over health effects of dangerous chemicals mounts and public funding diminishes, integrated management of available resources minimizing costly program gaps, inconsistencies and overlaps, becomes paramount.

States can develop responsible toxics management programs given responsible federal encouragement and support through research, information sharing and coordination, technical assistance geared to gain widest possible ripple effect, and flexible regulation and minimal procedural requirements.

This study has shown that a great deal of interest and activity exists in states to manage their own environmental affairs. Given appropriate coordinative support, resreach and information sharing under TSCA, they can do much to manage their own environmental destinies. Restrictive federal requirements for state assumption of federal programs are not needed and the drafters of the Toxic Substances Control Act are to be commended for their circumspect approach.

Perhaps the most useful contribution the EPA Office of Toxics Integration could make would be to intensify work with the Administration, industry and states to develop a productive national toxics policy. This should incorporate the hazard implications of all potentially dangerous chemicals in all media, operations and products, and define the relationships between all chemical management programs for all levels of government and the private sector.

II. INTRODUCTION

Chemical Proliferation

In the past decade, the nation's attempt to manage dangerous chemicals has presented problems of increasing proportion. During most of the post World War II era, the generation of toxic chemicals in this country has been rapid and virtually uncontrolled. Between 1940 and 1970, annual production of synthetic and organic chemicals increased by 340 billion pounds.[1] Now, in 1980 it is estimated that over 55,000 chemicals are in daily use in this country, with hundreds of new chemicals produced and placed on the market each year.[2]

Growth of Fragmented Legislation

In the 1970s the federal government attempted to remedy damage and ensure protection of the environment through broad-based legislation such as the Clean Air Act, Resource Conservation and Recovery Act, Federal Insecticide, Fungicide, and Rodenticide Act, and over fifteen other federal laws,[3] each regulating a particular environmental medium, hazardous matierials operation, hazardous substances product, or combination thereof. Such legislation clearly paved the way for enhanced government protection of the environment and the quality of life. The piecemeal passage of these laws, however, spurred the proliferation of overlapping jurisdictions and ad hoc programs at the federal level. This contributed to a fragmented approach to managing dangerous chemicals at all levels of government.

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1. Cancer and Industrial Production, Science Magazine 206, December 1979, p. 1356.
2. Toxic Substances: A Brief Overview of the Issues Involved, EPA (Washington U.S. Government Printing Office, 1980), p. 3.
3. EPA Region V Integrated Toxics Strategy.....Where All The Pieces Fit, EPA Region V Analytic Center, 1980, p.4.

Private citizens, concerned over the impact of chemicals in daily life, face a jumble of federal, state, and local agencies, each responsible for different aspects of chemicals management. The private chemical industry which has been virtually unregulated, must now find the means of complying with over twenty federal laws, as well as state and local laws, regulating the manufacture, use, transport, sale, and/or disposal of dangerous chemicals.

Growing Health Concerns

To date, most federal environmental legislation calls for protection of the environment, the implication being that a safe environment protects human health. It can be argued that this approach has overshadowed direct efforts to protect human health.

In the long term, the most elusive health hazard is the threat of slow, often invisible poisoning of the environment through chemical contamination. Active concern for such long term chemical hazards is now beginning to affect environmental protection laws, regulations, programs and activities. The passage of the Toxic Substances Control Act of 1976 indicated a heightened awareness at the federal level of the need to control toxic substances explicitly to protect human health. Implementation of this Act, unfortunately, has been hampered by numerous scientific and political obstacles.

Information Gaps

Lack of sufficient information about the amounts and properties of chemicals produced, used in industrial processes, distributed in commerce, transported, and ultimately disposed of as waste, makes it difficult to determine and implement the most effective measures to control chemical misuse. Knowledge of the short and long-term health effects of chemical exposure remains imprecise, insufficient, or even non-existant. In contrast, the economic benefits of the chemical market are well known. Strong action to control chemical substances is often deterred by two factors: their properties being so complex that their potential for damage is unknown, non-quantifiable and/or may not be manifest until long into the future; and profitability of chemical production and use that supercedes social costs.

Lack of National Management Policy

A national dangerous chemicals management policy that links the hazard implications of all potentially dangerous chemicals in all media, operations, and products, and considers the administrative relationship between all chemical management programs does not exist. The development of such policy has been hampered by the lack of nationwide awareness of long-term human health hazards, the slow accumulation of adequate environmental health knowledge, and inability to efficiently manage health crises.

Management Implications for States

The rapid and virtually uncontrolled growth of chemical production, the passage of piecemeal federal and state legislation, the subsequent proliferation of uncoordinated environmental control programs, the need for greater awareness and knowledge of the health hazard implications of toxic chemicals, the lack of adequate scientific and technical information, and the lack of a national management policy pose problems for environmental managers.

It is at the state level, however, that the lack of coordinated management presents the most severe problems. States, obligated to balance the protection of public health and safety with the protection of the state's economic base have created programs addressing toxics-related issues that are not covered by federal programs. In addition, many federal environmental laws require states to assume substantial program responsibility. For example, the Clean Air Act mandates that states develop State Implementation Plans (SIPs) for controlling primary and secondary hazardous air pollutants,[4] the Clean Water Act delegates primary responsibility for controlling nonpoint source pollution to the states,[5] and the Resource Conservation and Recovery Act requires every state and territory to develop an EPA-approved state plan for implementing, monitoring, and enforcing the federal regulations.[6] States, responding to both national mandates and local needs, tend to focus on the development of particular media, operation, or product-specific programs rather than overall integrated management strategies.

At a time when many federal and state agencies face substantial budget cuts, clear policy with administrative flexibility is needed to reduce gaps, overlaps and inconsistencies in authorities and management practices that squander scarce funds and resources. Continued inefficient management reinforces the popular view of government as excessive, wasteful, and ineffective, failing to protect human health and the environment and stifling the growth of industry and jobs. The financial constraints facing the federal government apply doubly to the states because federal budget cuts ultimately impact on federally-funded state programs, and a shortage of state monies further restricts state efforts to control dangerous chemicals. The existence of any local programs depends, in turn, on the viability of the corresponding state programs.

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[4] Tools and Rules ... Federal Environmental Protection Programs, EPA, 1978, p. 27.

[5] Tools and Rules, p. 2.

[6] Tools and Rules, p. 41.

TSCA: Prospect for Progress

Among the over twenty pieces of federal legislation regulating some aspect of dangerous chemicals, one act - the Toxic Substances Control Act (TSCA) - attempts to regulate toxic substances comprehensively, and "...for the first time the entire chemical industry serving the U.S. is subject to broad-based federal regulation."[7] "TSCA gives EPA a broad mandate to protect public health and the environment from unreasonable chemical risks - gather information on chemicals to identify harmful substances and to control those substances whose risks outweigh their benefits to society and the economy."[8]

TSCA provides the EPA the authority to assess the hazardous nature of a chemical prior to its introduction into the marketplace. EPA conducts a comprehensive inventory of existing chemicals and a prior notification procedure for manufacturing new chemicals or existing chemicals for new uses, at which time the agency may prohibit or regulate the manufacture, processing, distribution, or use of a chemical.[9]

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[7] The Toxic Substances Control Act: An Overview of its Authorities and Major Activities, EPA, 1979, p. 2.

[8] The Toxic Substances Control Act: An Overview of its Authorities and Major Activities, EPA, 1979, p. 2.

[9] The Toxic Substances Control Act: An Overview of its Authorities and Major Activities, EPA, 1979, p. 4.

The authority to enforce TSCA requirements is primarily carried out by EPA Headquarters with some activity at the regional level. Funding of TSCA activities does not extend to the state and local level, except for a small number of state projects financed under Section 28. Congress authorized $4.5 million for three years for grants to states to assist them in designing and implementing projects for the prevention or elimination of risks associated with toxic substances for which EPA is unlikely to take action.

TSCA is one of the first federal laws to address the prevention of serious health and environmental problems associated with toxic chemicals in our society. Other federal laws primarily enable the government to take action only after widespread exposure and possibly serious harm have occurred. TSCA provides for greater federal authority to control all aspects of toxic substances and addresses gaps in control that previously existed.

Section 9 of the Act mandates that EPA coordinate the management of dangerous chemicals across all federal authorities and programs. Serious efforts to implement this mandate have focussed on interagency, international, and inter-program cooperation. Coordination with, and among the states, has until now been overlooked.

EPA is currently developing a comprehensive toxics integration management strategy. Its aim is to "coordinate the toxic-related planning, research, information collection, regulatory, and enforcement efforts at all EPA's program and staff offices to ensure that resources are used most effectively."[10] The strategy is based on the following assumptions: existing media programs (air, water, resource conservation, etc.) need coordination; the existing scheme of chemical regulatory programs needs a critical assessment; and physical, environmental and fiscal damages continue to run a high risk of occurring in the absence of a more coordinated, comprehensive management strategy.[11] Intergovernmental coordination will be a new and important component of the strategy.

Elements and Benefits of Integrated Toxics Management

Development of a toxics integration strategy may not be the only framework for achieving comprehensive management of dangerous chemicals. It does, however, incorporate and balance key elements of a comprehensive environmental management approach. Such a strategy requires:

- the interlinking of environmental problems and program activities as they relate to all media, all operations, all products, all hazards and impacts thereof, all levels of government and all relevant government agencies and their functional areas of responsibility;
- the infusion of more focused attention and activity in the area of toxic substances control;
- the fostering of a philosophy of long-term mitigation and activities in support thereof, with regard to protecting human health; and
- the balancing of the economic and health costs and benefits of environmental control.

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[10] EPA Region V Integrated Toxics Strategy ... Where All The Pieces Fit, p. 1.

[11] EPA Region V Integrated Toxics Strategy ... Where All The Pieces Fit, p. 2-3.

A toxics focus in hazardous substances management accomplishes three objectives:

- it provides a common focal point around which all dangerous chemicals management activities can organize, and provides a point of departure for enhanced interagency coordination and cooperation;
- it heightens awareness and activity in an area of dangerous chemicals management where little is known, yet significant and perhaps irreversible damage to human health and the environment is suspected; and
- it provides for primary emphasis to be placed on the human health effects of environmental contamination.

The potential benefits associated with adoption of such a strategy encompass the following:

- cost savings through efficient coordination;
- prevention of future harm to health and the environment;
- promotion of coordination and cooperation within state government and among federal, state and local governments; and
- elimination of health effects information deficiencies.

The federal toxics integration strategy is in the early stages of development. Twelve states are developing similar state-designed integration strategies, with some receiving federal grant support under Section 28 of TSCA to implement specific elements of their policy. Much remains to be done, however, to mesh state and federal strategies into a nationwide comprehensive, coordinated system.

Purpose of This Study

This study and report were completed to assist state and EPA efforts to develop coordinated toxics integration strategies. The EPA Office of Toxics Integration (EPA/OTI) is interested in substantially strengthening federal-state cooperative mechanisms for the control and management of toxic substances. Designing a framework for federal-state cooperation and coordination depends heavily upon states' perspectives on their needs and potential roles. In cooperation with EPA/OTI, the National Governors' Association's Center for Policy Research undertook a three month review of state perspectives on overall hazardous materials management, focusing on toxic substances to support the development of this federal-state cooperative strategy.

At a time when most of the states and territories are only in the initial policy development or planning stages of dangerous chemicals management, this document is organized as a useful information tool for initiating management information exchanges between states and between states and the federal government. It also provides information for use by the EPA Office of Toxics Integration in its effort to establish viable federal-state cooperative mechanisms to achieve coordinated toxics integration management.

The study focuses on managerial rather than technical or scientific aspects of dangerous chemicals control. In broad terms, management consists of:

- the gathering of sufficient and accurate information and its organization to enable problem and/or goal definition;

- the identification of all applicable resources;
- the development of administrative structures capable of using information and resources effectively;
- the preparation and analysis of options for problem resolution;
- the choice of most productive options and the coordination of organizational systems that implement pieces of the ensuing effort;
- the evaluation of their success and incorporation of lessons learned into the management process.

Methodology

Initial exploration of state environmental management indicated that the state of the art varies tremendously. Informed recommendations to OTI on how to work more closely with states could only be developed after careful research on each state's and territory's toxic chemicals control activities in the context of its general approach to environmental management. State officials were contacted when in D.C. and by phone, state-prepared written materials were solicited, and recently published research studies on state activities in environmental management were examined for general insight. Efforts were made to probe each state extensively and develop descriptions and files on each; however, time constraints precluded detailed inquiry in all states. Because of the diversity of state management activities and to avoid inordinate length of this report, we have summarized and compared state management activities and highlighted unusual examples and innovations, rather than describe all states and territories. A great deal more detail is on file and available for review at the NGA Center for Policy Research. It should also be noted that our recommendations are based on our findings and expanded by our understanding of states' and territories' general needs developed from our continuous work with states in various arenas.

Through the process of gathering information from all states and territories, answers were sought to the following general lines of inquiry:

- what environmental management strategies, orientations, philosophies, or comprehensive policies prevail among states?
- in what ways are states organized to manage dangerous chemicals as they affect human health and the environment?
- what management functions and activities are implemented through the media, operation and product-specific environmental control programs, especially those related to toxics control?
- how do states achieve cooperation and coordination in environmental management?
- what prompts changes or modifications in environmental management strategies, organizational structures, management functions, and activities?
- what are the states' perceptions of their problems, needs, and priorities?
- to what extent is toxics control integrated into the state environmental management scheme, and how?

Initially, we reviewed relevant federal and state legislation and written materials, extracting information on state management activities, comprehensive strategies, control mechanisms, tools, and organizational structures in overall environmental protection. We conducted intensive telephone and in-person discussions with officials working on dangerous chemicals management in every state and territory. The governor's assistant responsible for environmental issues was identified and contacted, as well as officials of state environmental agencies and specific program offices. It was not possible to administer a standard survey or set of questions to states, because they are at different stages of development, have fragmented toxics activities, and interpret terms variously. In order to obtain an overall, accurate picture of each state and territory, it was necessary to talk with 3 to 9 officials in each and to examine a wide variety of documents (e.g., state/EPA agreements for 1980, state laws and regulations, state policy and strategy papers, organizational tables, state environmental newsletters, TSCA grant proposals, and executive orders). Preliminary written descriptions of each state's and territory's dangerous chemicals management programs were developed by NGA and then reviewed by a state official, usually the governor's assistant for environmental matters.

An advisory committee, comprised of ten state officials especially involved or interested in toxic substances control, was established and convened twice to discuss project planning, preliminary findings and the scope of specific concerns to be addressed.

In this study, the following specific areas of inquiry were excluded: consumer products (other than pesticides) dealt with under the federal statutes CSPA, FFDCA, FFA, and FIFRA, and radioactive materials. To the extent possible, all other aspects of dangerous chemicals management were researched. Technical and scientific aspects were explored only to the extent that they affect management concerns.

Report Content and Uses

This report consists of six main sections. An executive summary and this introduction form the first two sections.

The third section describes current state environmental program fragmentation, authorities, executive office involvement, general state problems, federal-state relations and problems, and state priorities. It concludes with a description of key elements for a state integrated toxics management strategy.

The fourth section is an analysis of states grouped according to their stage of development with respect to five descriptors. These are: interagency management practices, health effects monitoring and studies, information gathering, computerization of data, and individual environmental or toxics programs. Three groupings emerged and intergroup comparisons are made.

Section V describes illustrative state toxics integration management strategies, noteworthy state legislation, and innovative or interesting state chemical-related management programs. Descriptions of individual state strategies, legislation, and programs are provided, together with information on whom to contact for further details.

The sixth and final section provides contact information for key environmental officials in states and territories.

We have not attempted to include all states' strategies or program innovations. Only those that are relevant to the concept of toxics integration,or useful practices that have implications for enhancing cooperation or coordination in the management of dangerous chemicals, are incorporated.

Throughout the project, governors' aides, state officials, and program managers have expressed strong interest in the experiences of other states in attempting to control chemical misuse. It is only through achieving the greatest amount of communication among state and federal agencies that useful know-how may be shared, that unnecessary, duplicative work can be avoided, and greater coordination among all chemical management programs be obtained.

This report is descriptive, rather than conclusive. It would have taken far more time than that available to have made it so. Rather, it provides initial background information, identifies and defines problematic areas, outlines mechanisms for improved dangerous chemicals management at the state level, and establishes the backdrop from which appropriate intergovernmental mechanisms can be designed for enhanced toxics management.

III. THE CHALLENGE OF INTEGRATED STATE TOXICS MANAGEMENT

This section of the report describes current state perspectives on dangerous chemicals management, and toxics control in particular. Findings are extrapolated from comments and materials provided by states.

It should be noted that states often express general management frustrations such as "we need more federal dollars," and "one of our major problems involves coping with inflexible federal requirements." Such state perspectives should not be taken lightly, as they are perceived as real constraints, the implications of which must be creatively accommodated by any federal-state cooperative action plan.

Fragmentation in Toxics Management

The need to talk to several state officials and read a variety of state prepared materials in order to obtain an accurate picture of state hazardous materials and toxic substances management reflects the fragmented nature of current toxics control strategies. In most states, no one respondent could provide a detailed overview of the state's perspective and relevant hazardous materials management activities. The governor's assistant in charge of environmental matters was usually able to provide general information on whether or not the state has a comprehensive strategy, statewide priorities, problems or concerns, some insight into the politics of environmental control in the state, and names of additional state officials to be contacted for more specific information. Individual program managers (e.g., air, water, hazardous waste), then provided very detailed information, but only about the media, operation or product specific program which he or she implements.

Fragmentation is also exemplified by the fact that states are generally reactive when enacting environmental legislation or developing toxics programs. For example, in most states, extensive environmental legislation and programs have evolved primarily as a result of two factors: environmental crises or incidents which have generated the enactment of some level of environmental protection laws, and reaction to federal mandates.

Reacting to crises, federal mandates, or alarming data does not always result in fragmentation. Our review, however, indicates that often it does lead to ad hoc activities and short-term solutions.

In addition, toxics control activities undertaken by states to date appear to have been prompted by at least one of three elements: severe toxics crisis situations; preliminary health-related research indicating higher than national average incidence trends in diseases suspected of having causes rooted in environmental contamination; and relatively sophisticated environmental monitoring producing some alarming data on the extent of toxic pollution.

Terms and Definitions - Order vs. Confusion

State program managers have slightly different orientations toward definitions and elements of environmental management. Water people talk in terms of effluent discharges, priority pollutants, criteria standards and NPDES permits; hazardous waste people discuss generation, disposal and manifest system requirements; air people use the terms effluent emissions, federally-designated air contaminants, national ambient air quality standards, national emission standards for hazardous air pollutants, and so forth. The new toxics manager is confronted by a plethora of terms and concepts from which he or she must create order.

WHAT'S INVOLVED IN INTEGRATED TOXICS MANAGEMENT

PUBLIC INFORMATION
Liquids/Solids
FUNDING
Ammonia
CLASSIFICATION
AUTOMATED INFORMATION PROCESSING SYSTEMS
Human Health Studies
Sampling
Testing
Impacts
Environmental Safety
MANAGEMENT FUNCTIONS
ECONOMIC GROWTH
Public Involvement
Leaching (soil
CONSERVATION
Pollution Control Equipment
Scientific Expertise
PLANNING
Response Teams
Containers
Chemical Spills
HEALTH RESEARCH
Acids
DATA BANKS
Agreements
Siting
Aerosols
Certification
INFORMATION DISSEMINATION
Toxicology
Containment
TOXICITY (oral, dermal, inhalation)
Exposures (human health)
Contracts
SHIPMENT
INTRASTATE TRANSPORT
Medical Records
Information Sharing
Ordinances
NPDES
IRRITABILITY
HAZARDS
INFORMATION GATHERING
Accident Response
SUPERFUND
PCBs
Communicable Diseases
Taxation
Networking
POLLUTION
PACKING
Coloring
EMERGENCY MEASURES
HEALTH EFFECTS FOCUS
Statutes
Grants
Trade Secrets
AIR-SOIL-MEDIA-WATER-WORKPLACE
GOVERNOR'S OFFICE LEADERSHIP
Confidential Business Information
Raw Chemicals
IMPACTS
Investigation
Laboratory Facilities
IGNITABILITY
Labelling
Data Banks
RADIOACTIVITY
Committees/Task Forces
Enforcement
Inspection
Technical Expertise
Registries
STORAGE
Environmental Epidemiology
EVALUATION
Inventories
LOCAL GOVERNMENT
Spills
IMPORT-EXPORT
Production
Chlorine
TRAINING
PRODUCTS
LICENSING
ADVISORY SERVICES
CLEARINGHOUSE SERVICES
Employee Information
TOXIC INTEGRATION STRATEGIES
WASTE
Effluent Guidelines
State Laws
Waste Dumps
PSD
Coordination
Universities
Cleaning Agents
OPERATIONS
PUBLIC PARTICIPATION
Advisory Committees
Federal Laws
REACTIVITY
Handling
Permitting
Emissions (air)
Regulations
Hazards
Communication
Prioritization
Equipment
Landfill
Adhesives
CORROSIVITY
Commercial Distribution
Litigation
Chemicals combined to form sale items
Mining
REGULATING
Drinking/Waste Water
Fungicides
EXPOSURE REDUCTION
PUBLIC SAFETY
END USE PRODUCTS
MANUFACTURE
Exotic Chemicals
INTERNATIONAL TRANSPORT
Phosphates
Sanctions
Exposure Level Effects
NEEDS ASSESSMENTS
Quality Control
BY-PRODUCTS
Personnel
Monitoring
CHEMICALS
Beryllium
PROGRAM INTEGRATION
Health Centers
STANDARD SETTING
Carcinogens
Manuals
Pesticides
Economic Impact Studies
REPROCESSING
PROCESSING
BUSINESS AND INDUSTRY
Insecticides
TAXONOMIES
Resource Sharing
Dioxins
Manifests
FLAMMABILITY
Interjurisdictional Agreements
Additives
Interagency Agreements
Rodenticide
AUTHORITIES
Operational Requirements
Resource Identification
INTERSTATE TRANSPORT
PreTreatment
Compliance
Discharges (water)
DISPOSAL
Building Codes
EXPLOSIVITY
Defoliants
Fines & Penalties

A multitude of elements, terms, concepts and meanings used in different environmental contexts makes it difficult to communicate with and between various state agencies. Most states conform their laws and programs to follow definitions, concepts, and terms found in counterpart federal laws, regulations and programs. Few states have attempted to cross reference or create all encompassing definitions of hazardous materials or embrace "umbrella" statutes outlining general pollution control elements of statewide environmental management.

Most state environmental managers operate programs tailored to specific media, operations or products, and hence may only need to master one or two definitions, acts, regulations, and lists of regulated substances and the relevant terminology. Few express concern over communication problems between programs. We question, however, whether integrated environmental strategies and comprehensive policies can be structured to cut across state agency programs without a greater degree of integrated terminology and cross-referencing that could provide for enhanced inter-program communication.

State dangerous chemicals coordinators need to analyze how various state program managers interpret laws, functions and terms differently, and then must interrelate them in order to coordinate effectively. Management tools that chart various definitions and commonly used terms and their interrelationships would be useful for both federal and state toxics integration managers.

Although an indepth examination of all the terms, concepts and elements involved and their interrelationships exceeds the scope of this study, the outlining of general components provides insight into comprehensive toxics management.

Public administrators can take a very broad or very narrow approach to what is involved in the management of *hazardous substances, hazardous materials, dangerous chemicals,* or *toxic chemicals.* Dictionary definitions imply a very broad approach toward dangerous chemicals management. For example:

- hazardous substance: a physical *material* from which something is *made* or which has discrete existence (or matter of particular or definite chemical composition) *involving or exposing one to risk* (as of loss or harm).
- hazardous material: the element, constitutent, or *substance* of which something is *composed* or can be made (or matter that has qualities which give it individuality and by which it may be categorized) *involving or exposing one to risk* (as of loss or harm).
- dangerous chemical: a *substance* (as element or chemical compound) obtained by a *chemical process* or used for producing a *chemical effect involving or exposing one to risk* (as of loss or harm).
- toxic chemical: a *substance* (as element or chemical compound) obtained by a *chemical process* or used for producing a *chemical effect* that is poisonous, i.e., that through its chemical action usually *kills, injures, or impairs* an organism.

Note that *dangerous* is considered a synonym for *hazardous* and that the word *material* is used in defining *substance* and vice versa.

It appears that *dangerous* or *toxic chemical* refers to a slightly more specific type of harmful substance or material. Recall, however, that chemicals are simply the 92 natural elements and the 12 man-made elements that form the essence of life, and that anything can, in its broadest sense, be poisonous depending upon the circumstances.

The most important subtlety among the four terms lies in the hazard impact on the health of living organisms. Hazards vary according to their toxicity (mutagenicity, teratogenicity, carcinogenicity), flammability, corrosivity, reactivity, radioactivity, explosivity, and irritability. Each dangerous chemical may be capable of causing any or all of these hazards at any time, depending upon the circumstances. The concept of toxicity implies hazardous effects causing direct harm to living organisms through poisoning. This underscores the importance of the goal of environmental protection, i.e., the explicit protection of living things from harmful exposures.

While flammable, corrosive, or explosive hazardous substances, materials, or dangerous chemicals can kill, injure, or impair living organisms, their hazardous effects are more external in comparison to the poisonous effects of toxic substances that harm living organisms through oral, dermal or inhalation means. A substance that ignites or explodes poses more of a short-term, immediate hazard to living organisms, while a poisonous substance generally poses a more long-term, elusive threat to living organisms.

For the purpose of this study we use *hazardous substance*, *hazardous material* and *dangerous chemical* interchangeably within their broadest context. The terms *toxic chemical*, *toxic substance*, or *toxic material* refer to a subset having the distinguishing quality of posing the primary hazardous effect of toxicity or "poisonousness" to living things.

Although all dangerous substances could be considered poisonous under certain circumstances, primary hazard implications vary, i.e., the primary hazard implication of substance X is toxicity whereas for substance Y it is flammability. To the extent that adequate information exists for various dangerous substances, a chart indicating primary and secondary hazardous effects would be useful as a first step in delineating environmental management responsibilities. The U.S. Geological Survey's environmental impact matrix is a good example of such a "decision-making" chart.

State Environmental Authorities

For the most part, all the states have authorities to carry out major environmental control programs. State laws are mostly patterned after their federal counterparts, with few exceptions. Where such exceptions were noted, they are documented in the state groupings section and Section V. These exceptions represent aspects of state laws that vary somewhat from their federal counterparts. Variations are for the most part relatively minor and usually involve slight differences in definitions of hazardous waste, pesticide registration or use requirements, hazardous waste volume exemptions, and in the setting of standards for air or water pollutants not federally-regulated. Additional exceptions might be uncovered through a more detailed state legislative analysis than time permitted. What appears to be a lack of creativity in legislation may be attributable to two factors in particular: the tendency of states to react to federal mandates as opposed to being proactive often due to a lack of time and resources; and the restrictiveness of federal mandates that allows little room for creativity within the guidelines constituting "substantially equivalent authority."

Some states have "umbrella statutes" that outline general state authority in several of the seven environmental control areas. Two examples in Oklahoma and Illinois are described in Section V of this report. These are interesting from the standpoint that they represent "integrative" tools in and of themselves. They pull together various definitions and general requirements governing air, water, hazardous waste management, among others, and cross-reference other state laws providing authority for more specific environmental practices.

While umbrella statutes are not necessarily the only way to integrate state toxics management, they can provide a "one-stop" reference to many state environmental authorities for use by environmental coordinators who must often keep abreast of several areas of concern. They can also eliminate the need for individual laws for air, water and hazardous waste for example, allowing for state regulations to delineate the specifics rather than having an air law and a set of air regulations, a water law and a set of water regulations and a hazardous waste law and a set of hazardous waste regulations. Perhaps legislative reviews for overlaps, gaps and inconsistences would be better facilitated if umbrella statutes were used. In addition, functional integration efforts such as one-stop permitting could be mandated in an umbrella act, as opposed to using a separate law or executive order to support its use. A completely integrated strategy at the policy and operational levels, does not, however, depend on umbrella legislation, although it may be enhanced by such means.

Several states have interesting laws which do not really parallel federal laws. Most of these laws are evidenced by Group X states and concern information-gathering authorities. Examples include:

- Maryland has a cancer reporting law whereby public or private hospitals or institutional labs must report to the Department of Health and Mental Hygiene every positive tissue-based diagnosis of human cancer (note, law may be amended to require reports be made primarily from the hospital based tumor registries, excluding lab reporting requirements);
- Maryland also has a physician reporting requirement law whereby clinics and hospitals are required to report on poisonings or adverse reactions from drugs or toxic agents;
- California has a workplace carcinogen reporting act requiring users to report worker exposure and use information;
- Virginia's TSIA and Connecticut's carcinogen statutes are documented in Section V of this report.

Nearly all states considered their authorities to be comprehensive and complete or will be so as soon as appropriate regulations are finalized to support the laws already passed. This is primarily true among states where federal enforcement authorities have been assumed.

Only a few states felt the need to enact additional authority in order to control toxics, i.e., authority other than that currently being sought or implemented by the states to enable assumption of environmental program enforcement from the federal government. In several instances, states have passed legislation imposing the legal notion of strict liability on hazardous waste generators and disposers in order to shift the burden of proving negligence in handling toxics from the individual/plaintiff to the industry/defendant. With such legally imposed strict liability, the burden falls on industry to refute the individual's claim that, if not for the industry's actions, the plaintiff would not have suffered damages (personal or property).

If any gaps exist in state laws, our review suggests that it is in the information gathering areas of chemical production and use, worker exposure, and public health data such as cancer incidence or physician reporting requirements. Other than emergency health powers, most states do not have authorities to systematically gather health-related data such as cancer incidence, worker exposure data, or physician reports of toxic exposure incidents. Other than hazardous waste generation inventories and pesticide production/use information, most states do not have explicit authority to systematically collect chemical production/use data.

Governors and Executive Office Involvement

Most states reported that the governor is directly involved in hazardous waste issues which, of course, have generated a great deal of public attention. Less need has been seen, to date, for executive office involvement in overall toxics management. A major exception, however, appears in five states which report strong, direct governor's involvement in strategy development for integrated toxics management. There is no doubt that the governor's involvement has contributed to these states' progressive development in toxics integration.

General State Problems

State environmental and toxics management are beset by a plethora of technical, financial, organizational, political, and informational problems. The compilation of comments received from officials in the 52 states and territories is expressed in percentages. They are based on the number of states out of all states that had at least one official report a particular problem, rather than on the total number of officials responding. Not all officials responded to the general question posed, "what are your state's problems in environmental management and toxics control activities," and specific problems were not referenced in questions posed to those queried. Low percentages should not therefore be interpreted as an indication of the lack of pervasiveness of a particular problem. Many officials pinpointed only one or two pressing problems indicating that with more time and forethought a detailed description of state problems could be made. Although the method of obtaining a general picture of state management difficulties and of quantifying specific problems mentioned for general comparison purposes tends to deflate actual percentages, these percentages can provide insight into areas to be explored in establishing federal-state cooperation in toxics integration activities.

Technical Problems: The *lack of adequate technology and scientific procedures* to track sources of toxics contamination and to establish degrees of risk to humans and the environment is indicated as a problem by twelve percent (12%) of the states and territories, specifically in regard to testing for surface, drinking and ground water contamination, exotics and instances of long-term degradation as opposed to chemical spills. The states view this as necessary to mitigate future occurrences of toxics contamination, and generally reflects a need for better information on the level of toxicity of chemicals entering state waters.

In addition, ten percent (10%) specify the *lack of special equipment* designed specifically to assess water quality and determine levels of contamination as a difficulty. The expense of existing chemical detection equipment and, in some cases, its non-existence are sited as prohibitive factors for the states. Included under this category is the expense and lack of monitoring equipment, a resulting inability to do extensive chemical analysis, to afford repairs and recalibrations for existing equipment.

Financial Problems: The *lack of money to support administrative costs* is cited by thirty-eight percent (38%) of the sample states. These administrative costs primarily include support of necessary personnel and equipment to implement federal and state authorized chemical-related programs (clean up of large chemical spills, inactive hazardous waste sites, and cases of pesticide misuse).

The *lack of a highly paid, specialized technical staff* (epidemiologists, industrial hygienists, laboratory analysts) is seen as a problem for fifteen percent (15%). In many cases, state salary restrictions under civil service codes are the prohibiting factor in hiring and maintaining such highly specialized personnel.

Approximately six percent (6%) of the sample point to the *lack of funds to support research, development and application of technical solutions* needed to help industry and local governments comply with environmental pollution control requirements. Adequate funding for these needs is usually not provided to the state from state or federal appropriations. Available federal funding is often plagued by the lengthy time period in receiving federal dollars further hampering the state's ability to satisfy these technical needs.

Procedural Problems: *Laboratory backlogs* (overloads) are indicated as a problem by approximately six percent (6%) of the sample. The lack of time, money and staffing to carry out the necessary amount of environmental sampling and monitoring is seen as hampering a timely, thorough analysis of possible toxics contaminated samples.

Eight percent (8%) also perceive the time and financial constraints involved in *training state epidemiologists in environmental health procedures and problems* as particularly difficult. Several states point specifically to the lack of epidemiologists trained to assess and respond to the environmental health impacts associated with chemical-related emergencies.

Regulatory Problems: The *lack of standards for chemical contamination* is viewed as problematic for eight percent (8%) of the states and territories. The need for research and development activities especially to meet unique state needs, and the data and time required to adequately develop these standards are indicated as integral components of this problem.

Political Problems: Twenty-seven percent (27%) of the sample point out the existence of *local political hazardous waste problems* in their states. The lack of public awareness and environmental education programs are seen as contributing factors leading to public opposition to siting of hazardous waste disposal facilities and clean up activities. Additionally, several states point to increased media publicity over toxics/hazardous waste incidents as contributing to public outcries which make "rational" local government decisions in the area more difficult.

Conflicts between states' need to protect the public and industry's need to develop resources, complicated by depleting resources present problems for eight percent (8%) of the states and territories. States point to the difficulty in accommodating constant pressure for economic and technical growth with a depleting finite resource base, in addition to industry unwillingness to support pollution control programs (especially when industry is a controlling force in the state legislature). One state in particular cited the problem of responding to a rapid increase in state resource development which negatively affects the quality of the environment and requires a sharp increase in the state's administration of environmental regulations.

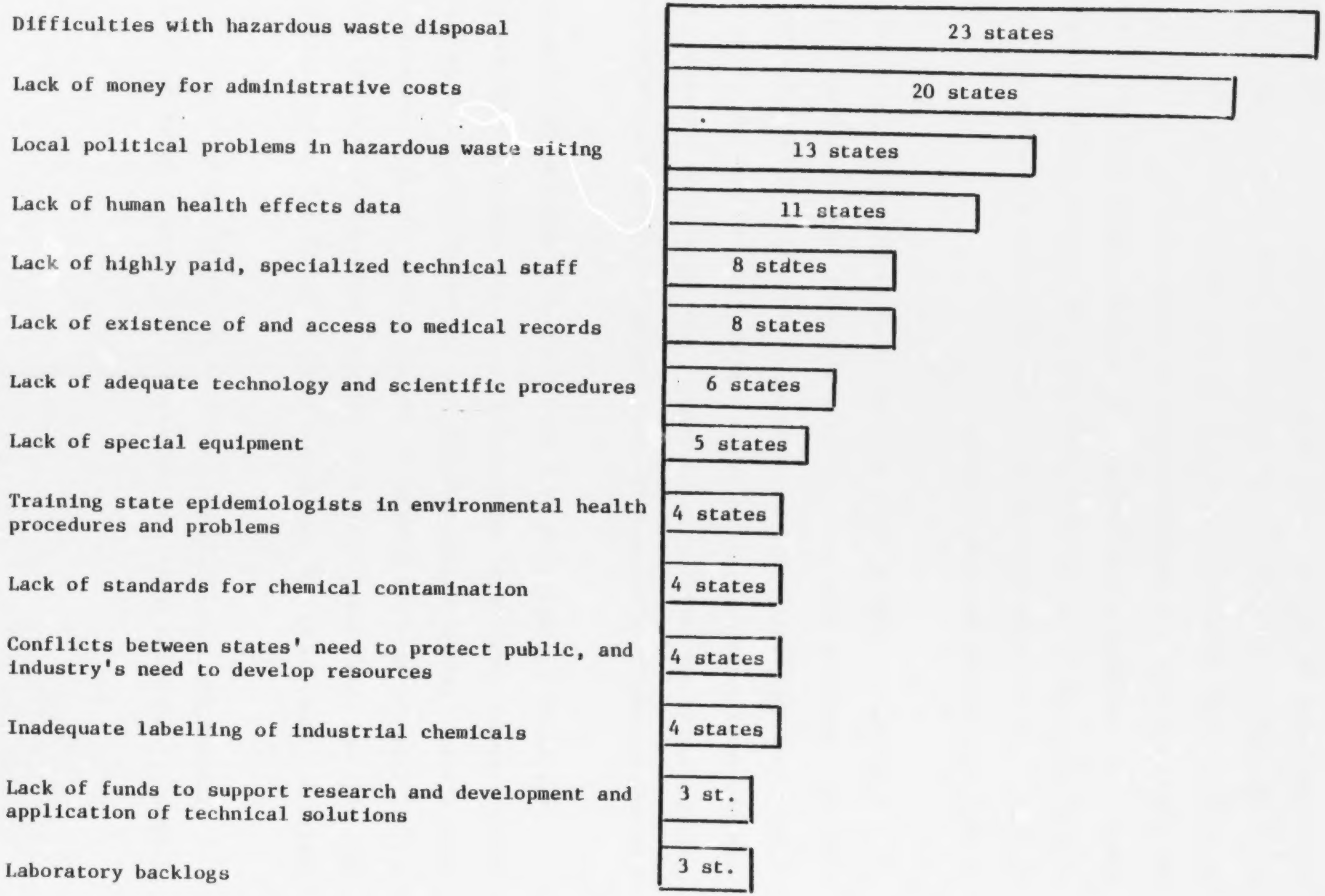
Information Problems: The *lack of access to and existence of medical records* necessary to monitor the human health effects of chemical exposures within the state population is specified by fifteen percent (15%) of the sample. This deficiency exists not only in the lack of collection of chemical exposure data by physicians and coroners filing medical and death reports, but relates also to the lack of systematic collection procedures for such data. Several states indicate that the lack of awareness on the part of physicians and other medical professionals for the need to consistently record and report the type of chemical exposure and illness-related information necessary to do epidemiological research is a problem. Additionally, the lack of access to industry worker medical records (often necessitating states going to court to obtain such information in order to protect worker health and safety) is seen as a problem for several states.

Eight percent (8%) of the sample feel that an *inadequate labelling of industrial chemicals* poses problems in establishing safe use methods. Some states point specifically to the packaging of chemicals and the labelling of chemical waste containers, while others suggest that the general lack of adequate packaging and labelling requirements leads directly to increased program constraints by requiring more state testing and monitoring procedures.

Twenty-two percent (22%) feel that the *lack of human health effects data* presents severe problems in sufficiently controlling chemical exposures within their states. Several states indicate that the non-existence of much needed control data for specific segments of the population (children, pregnant women, regional inhabitants) results in program constraints such as the need for additional time, money and specialized staff to gather and analyze this data.

Program-Specific Problems: *Technical difficulties associated with the disposal of hazardous waste* are documented by forty-five percent (45%) of the

STATES' MAJOR PROBLEMS IN ENVIRONMENTAL MANAGEMENT *



* Summary of state/territory responses to question: "What are your state's problems in environmental and toxics control activities?"

sample. These difficulties range from the general issues of lack of sites, plans, clean up capabilities and alternatives for hazardous waste disposal, to more unique state needs such as a high water table, insufficient volume of waste to sustain a site, and the need for inventories and evaluations of disposal needs.

Federal-State Relations and Problems

State toxics management cannot be examined without an analysis of state-federal management relations. States were thus queried and a number of considerations and problems identified.

The two major federal agencies working with states in toxics control activities are EPA and DOT. Virtually all state agency environmental officials work in some respect with EPA (either out of Headquarters or the regional office), although most direct state-EPA activity is carried out through EPA regional offices. State-DOT relations are centered primarily around the transportation of toxic substances, whether it be the implementation of chemical labelling and packaging requirements for interstate transport, setting up enforcement systems, or responding to transportation-related chemical incidents.

Not all states or state officials indicated that a specific relationship, positive or negative, exists between the federal agencies discussed below. An attempt has been made, however, to document the general orientation toward relationships that exist between the states and these federal agencies, and to provide the primary factors states attribute to the nature of such relationships. Percentages were again calculated and the caveats presented earlier prevail herein as well.

EPA-State Relations: Seventy-seven percent (77%) of the fifty-two states and territories in the sample report *good or satisfactory relations overall with their respective EPA Regional Office.* They attribute this primarily to:

1) long-term working relationships developed between state and regional office staff;
2) regional office responsiveness to requests for information and assistance from states;
3) regional office understanding of unique state needs; and
4) frequent meetings or other forms of direct contact between the states and regional offices.

Thirty-one percent (31%) report an *unsatisfactory relationship with EPA Headquarters*. States attribute their disenchantment with Headquarters to a feeling that federal staff do not know the state personnel responsible for implementing state and federal programs, primarily due to the constant changeover in personnel at Headquarters. The lack of direct federal contact with states and the lack of federal responsiveness to state requests and unique needs are perceived as contributing factors. Numerous states point to a need for more practitioners (specifically enforcement and techncial personnel) as opposed to lawyers at EPA Headquarters. And finally, states feel particularly constrained in carrying out pollution control programs as a result of conflicting reports emanating from Headquarters and the regional offices, with the states often unable to determine which are official policy statements.

DOT-State Relations: *Overall good working relations with regional DOT offices* are reported by seventeen percent (17%) of the sample, primarily attributed to the same factors responsible for the positive relations between states and EPA Regional Offices - long-time working relationships, understanding of unique state problems and needs, regional office responsiveness to state requests and frequent meetings.

States discussing their relations with DOT indicated *infrequent, although generally satisfactory relations with DOT Headquarters.* Apparently there is not a great need to work directly with headquarters staff implying that DOT Regional Offices are able to meet states' needs appropriately.

Additional Federal-State Relations: States indicating a specific working relationship with the federal Occuaptional Health and Safety Administration (OSHA) are primarily either very positive about OSHA's responsiveness to state problems and needs, or very negative. Those states indicating positive relations point to OSHA technical staff as extremely responsive to state requests for information on standards and testing procedures. Those states reporting negative relations are generally disenchanted with the extent of OSHA activity in the state that is duplicative of existing state program activities and critical of OSHA's orientation toward protecting worker health. In their view, OSHA seems overly attentive to citing industry violations and not attentive enough to collecting worker exposure data or providing technical assistance for correcting cited violations.

In addition, several states report good relations with other federal agencies such as FEMA (on emergency matters), USDA (pesticides), and HHS (FDA). These agencies, however, are seen as operating within the states basically in response to specific problems, often emergency-related.

Attitude Problems: *Lack of federal consideration for unique state needs and problems* is cited by seventy-seven percent (77%) of the states and territories. Specifically, the perception that federal legislation, regulation, and prescribed implementation procedures do not allow for enough *flexibility* from state to state is cited by fifty-two percent (52%) of the states. In particular, they referred to the narrow orientation of national legislation, detail of procedural requirements, lack of local orientation, centralization of power in EPA Headquarters, resulting discouragement of state innovations, and lack of time and funding to assure proper interpretation and administration of regulations. Ten percent (10%) of the fifty-two states and territories see a lack of consideration on EPA's part over the *practical implications* of implementing a regulation in a particular state or territory as a major concern. Forty percent (40%) view EPA as maintaining a *blanket expectation* that states will implement rules and regulations developed by EPA exactly as told, regardless of the states' lack of staff and funding. Eleven percent (11%) of the total sample view EPA as *too strict* in its oversight of procedural guidelines for state implementation of federal mandates, rather than focussing its concern on achieving the final results of human health and environmental protection. In addition, federal overregulation of activities leaving little room for state creativity is indicated as another aspect of inflexibility.

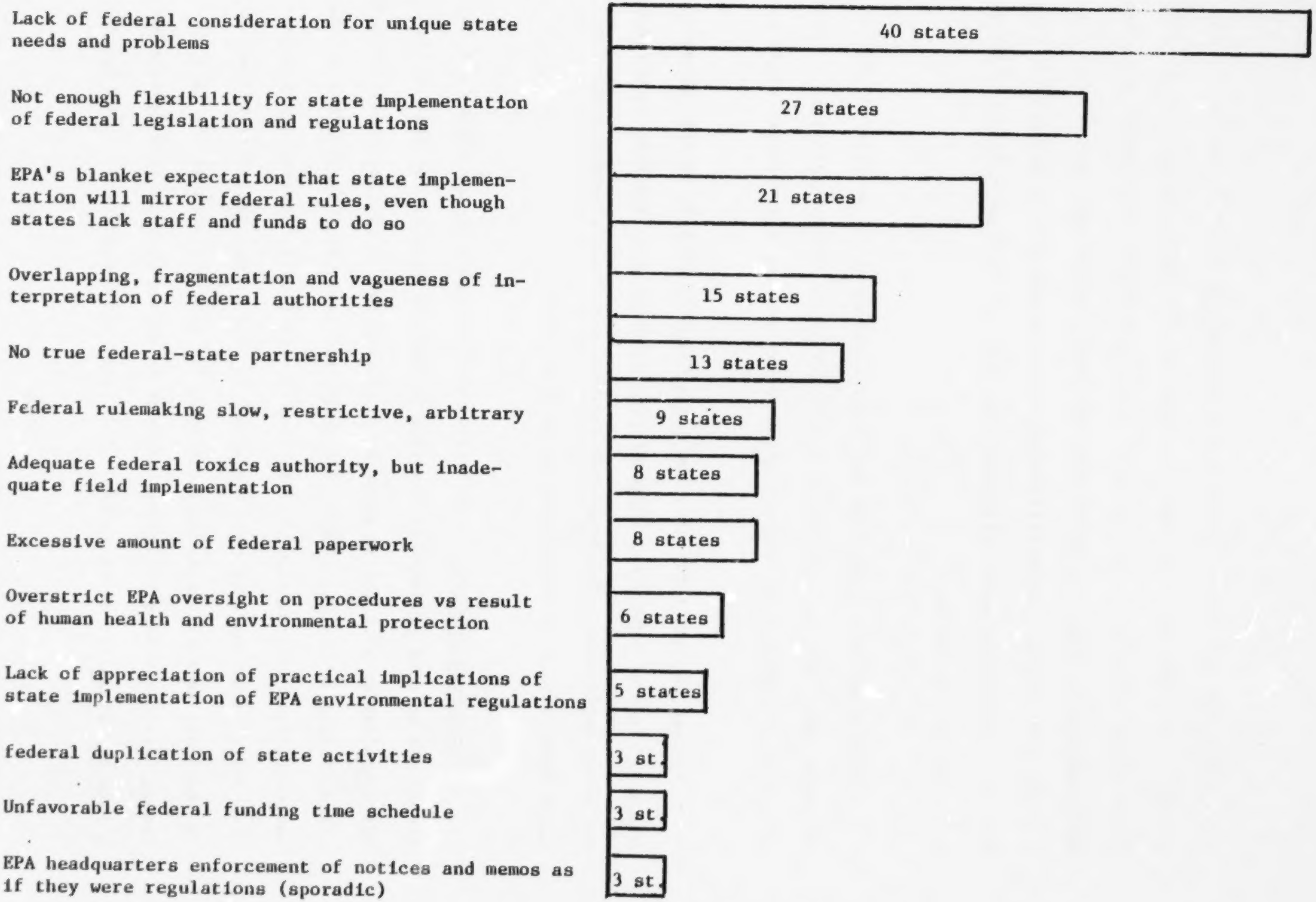
Coordination Problems: The *overlapping, fragmentation, and vagueness of interpretation of federal authorities* is indicated as a problem for twenty-nine percent (29%) of the states and territories. The inconsistencies, complexities, and confusion in federal toxic control authorities is viewed as presenting difficulties in the private sector as well as state and local government, and is seen as fostering and reinforcing state fragmentation requiring additional staff and money to keep up with these complexities. Specific examples cited by states include: EPA's indefinite interpretation of regulations making state implementation difficult; varied and confused EPA directives; overlapping transportation-related responsibilities between EPA and DOT; and a hazardous waste definition that does not include hospital, laboratory, and mining wastes.

Fifteen percent (15%) view the *federal authority to control toxics as adequate, but field implementation is not.* This is seen primarily as a result of a lack of coordination between EPA Headquarters and its regional offices.

Fifteen percent (15%) also see a coordination problem in the *excessive amount of federal paperwork,* where program planning and reporting requirements are often duplicated. The paperwork involved with federal-state grants is cited specifically by several states in this group.

Procedurual Problems: Twenty-five percent (25%) of the states and territories see *no true partnership* existing between themselves and EPA. A lack of EPA consultation with states prior to proposing and finalizing regulations is disconcerting to states. Often, EPA comes out with regulations after states have submitted program plans in response to prior rules necessitating extensive state revisions that cost the state in time, money and other resources. In addition, several states indicate specific problems such as the lack of federal responsiveness to states attempts to participate in rule development, a lack of federal trust of states' abilities, and a feeling of token delegation

MAJOR STATE-FEDERAL PROBLEMS IN ENVIRONMENTAL MANAGEMENT *



* State/territory responses to question: "What are your state's problems with the federal government in managing environmental and toxics control activities?"

of authority to states from EPA.

Seventeen percent (17%) view the *federal rule-making process as too slow, restrictive and arbitrary*. States find difficulty in having to wait to develop their rules, regulations and plans, thereby allowing industry to wait to correct acknowledged problems.

Federal duplication of state activities is viewed as a problem by six percent (6%) of the sample states and territories. Especially noted in this context is the duplication of field investigations by the federal government resulting in industry annoyance, which is in turn conveyed to state and local government officials.

Six percent (6%) also see the *federal funding schedule as not favorable* for the states. The states indicate that by not receiving federal program funding at the start of the fiscal year, due often to OMB and Congressional delays, the states are left with the responsibility of administering programs without federal monies during the time lag. This often requires states to borrow money to compensate during this period, and ultimately results in increased program costs.

Six percent (6%) cite *EPA Headquarter's enforcement of notices and memoranda as if they were regulations* as restrictive. Additionally, this is done with no set pattern resulting in confusion for the states.

Another six percent (6%) see the *federally imposed timetable for* *assuming program control as too quick*, not allowing for consideration of individual state problems and needs. Such timetables rarely, for example, take into account the fact that in some states the legislature (which must approve state programs) meets only once every two years.

State Priorities and Needs

At the present time, many states indicate they need assistance targeted for certain environmental programs to attain levels of competency they consider adequate to address respective priorities. Nationwide, they cite the following major program areas as in need of prioritized assistance: hazardous waste management (63%), emergency preparedness (27%), clean water (17%), environmental epidemiology and toxicology (17%), technical training (13%), and pesticides (10%). More specific state needs for improving these priority program areas are discussed below. In addition, states have informational, technical, financial, legislative, and procedural priorities and needs that relate to many program areas. Percentages were again calculated and caveats discussed earlier prevail herein as well.

Program-Specific Priorities and Needs: Twenty-seven percent (27%) of the states and territories in the sample specified as a priority the *development and implementation of chemical-related emergency mitigation and response plans and training programs for local government and on-scene officials*. Several states specifically indicated the need for county level emergency response plans, a state-federal interagency emergency response team, as well as equipment and chemical handling training programs.

Seventeen percent (17%) of the sample place priority status on *increasing emphasis on toxics contamination of state waters* through increased assessment, monitoring and control activities. Ground, surface and drinking water supplies are included in this broad category, with states indicating the need to develop control plans and state regulatory authority, and to improve coordination of programs for preventing and responding to chemical spills into state waters.

Another seventeen percent (17%) see a distinct need to *increase capability and activity in the epidemiology and toxicology fields.* States see this occurring through the development of testing procedures to determine human health effects of chemicals, the correlation of cancer incidence data with state chemical production data, the increase in integrated toxics strategy funding, and the expansion of the state industrial hygiene staff.

The need to *increase hazardous waste management activities* is singled out by sixty-three percent (63%) of the sample. These activities include: siting PCB disposal facilities, determining the effects of toxic wastes, cleaning up abandoned sites, inspecting existing sites for compliance, setting up a national manifest system to track hazardous waste disposal, and developing, implementing, and upgrading the state programs to comply with the Resource Conservation and Recovery Act (RCRA).

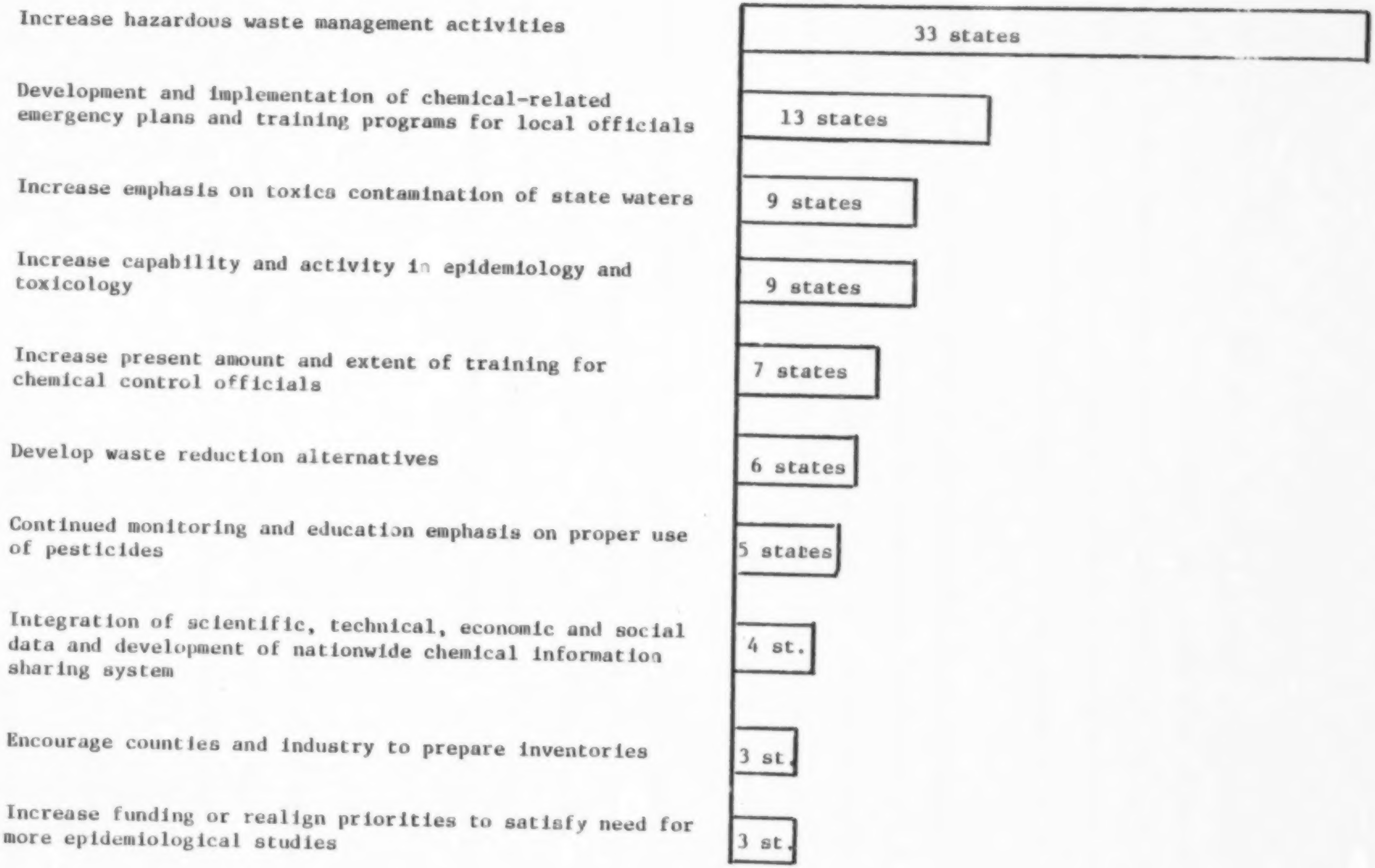
The *continued monitoring and educational emphasis on proper pesticides use* to minimize environmental and human health risks is seen as a priority for ten percent (10%) of the states. Several indicated the particular need for increased chemical testing of pesticides and the maintenance of existing pesticides programs.

Information Priorities and Needs: Six percent (6%) of the states and territories in the sample indicated as a priority *encouraging counties and industries to prepare chemical inventories* of local manufacturers, users, transporters and storers of chemicals/hazardous materials. Included in this priority is the encouragement of county level procedures for identifying sources and testing techniques for chemical exposure.

The *integration of scientific, technical, economic and social information* in the planning and development of regulations, and the *development of a nation-wide chemical information sharing system* are designated priorities of eight percent (8%) of the states. The priority for integration includes multi-disciplinary and multi-agency coordination and the development of resource sensitive environmental control strategies.

Technical Priorities and Needs: Twelve percent (12%) of the sample specified the *need to develop waste reduction alternatives* such as recycling, detoxification and resource recovery as important. These states are looking to develop methods of handling hazardous waste through other than traditional land disposal siting mechanisms.

STATE PRIORITIES AND NEEDS FOR ENVIRONMENTAL MANAGEMENT *



* Summary of state/territory responses to question: "What are your state's priorities and needs for Environmental and toxics management?"

Financial Priorities and Needs: Of the fifty-two states and territories in the sample, six percent (6%) indicate the *need to increase funding or realign priorities to satisfy the need for more epidemiological studies.* Included in this priority is a specific attempt to increase the industrial hygiene staff to monitor and test for chemical exposures in the workplace.

Legislative/Regulatory Priorities and Needs: Among the diverse legislative and regulatory priorities being addressed by the states and territories, the attempt to *increase the punative impact of fines for hazardous waste violations* through increasing fines or criminalizing disposal violations is specifically cited by several states.

Procedural Priorities and Needs: Thirteen percent (13%) of the sample stated a need to *increase the present extent and amount of training for chemical control officials* in their states and territories. Training in this category includes such areas as transportation enforcement, pesticide control, and general technical training for chemical monitoring, investigation and analysis.

Integrated Toxics Management

Managers of integrated toxics control programs must ensure that fundamental components exist and are effectively coordinated. These include: media, operations, products, impacts, hazards, and management functions.

Hazardous substances threaten the environment and living organisms through four media -- air, land, water, and workplace. Although workplace is not usually referred to as a medium, and actually encompasses the other three media, we label it as a separate medium because of its importance as a closed environment in which people are likely to have closer, more prolonged exposure to potentially dangerous chemicals.

Operations refer to the extraction, generation or production, processing, use or reuse, handling, labelling, transport, sale, import or export, storage, and disposal of hazardous substances.

Products refer to raw materials, intermediate products, catalysts, final goods, by-products, and waste of which hazardous substances may form part or the whole.

The impacts of dangerous chemicals include emissions (air), discharges (water), leaching (land), and exposures (humans and animals).

It is through the impacts on living organisms and the environment that hazards are created, i.e., toxicity (oral, dermal, inhalation), flammability, corrosivity, reactivity, radioactivity, explosivity, or irritability.

The key management components of dangerous chemicals control include:

- management strategies: general policy, orientation or philosophy underlying all environmental control programs and activities, providing a point of departure for coordination and cooperation among state agencies and between state and federal agencies;
- organizational structures: frameworks within which the strategies operate;

- management functions: activities that design, implement and evaluate the strategies within the organizational structure. These encompass coordination, planning, passing laws and regulations, funding, registering, licensing, permitting, certifying, training, educating, responding to emergencies, sampling, citing violations, prosecuting violators, research and development;

- management tools: resources such as meetings, EPA/state agreements, interstate and local mutual aid agreements, memoranda of understanding, laws and regulations, policy papers, executive orders, official planning or strategy documents, technical reports and experts, funding mechanisms, managers, personnel (private and government), and materiel.

The concept of disaster or emergency within environmental management is vitally important. The processes involved in the prevention or reduction of (known as mitigation), preparedness for, response to, and recovery from all types of disasters represent the essence of all government schemes to protect life and property. Dangerous chemicals emergencies and disasters involve protecting the environment either from high impact emissions or from general, long-term degradation as a result of long-standing, pervasive pollution.

Environmental disease, unlike communicable disease, has its roots in man-made occurrences. Like all other types of man-made and natural disasters, environmental disease possesses short and long-term implications which must be mitigated, prepared for, responded to, and recovered from. The understanding that environmental disease possesses short and long-term emergency implications remains primitive, largely due to the lack of advanced scientific and medical knowledge of the linkages between environmental contamination and the health of living organisms.

Not only must managers conceptualize and act on short-term environmental emergencies such as spills and accidents, but they must also conceptualize and act on long-term environmental disease and contamination problems as if they were potential emergencies. The cancer "epidemic" caused by chemical contaminant X twenty years from now may not seem like an emergency or crisis situation now; however, if not considered today, potentially irreversible damage may occur for which no late emergency response plan can provide relief. Long-term health implications as well as short-term accident suppression are both vital aspects of environmental emergency management.

Integrated management of hazardous substances therefore, involves the elements of media, operations, products, hazards and impacts thereof, for which management strategies, organizational structures, functions and tools are devised so that government can mitigate, prepare for, respond to, and recover from human health and environmental degradation in the short and long-term. A "comprehensive" toxics strategy implies the integration of the above and the encouragement of management practices that focus attention and action on toxic substances with explicit implications for the ultimate protection of the health and well being of living organisms.

The following chart may be useful to environmental managers to identify and locate some of the most pertinent dangerous chemicals management functions throughout the state and evaluate the extent to which they are, or should be integrated throughout each of the four environmental media.

MANAGEMENT FUNCTIONS

CHEMICAL LIFE CYCLE

MEDIA to be protected throughout --- AIR SOIL/LAND WATER WORKPLACE	LICENSING			STANDARD SETTING			MONITORING			TRAINING				NATURE & SCOPE OF AUTHORITY				ENFORCEMENT					EMERGENCY MEASURES					INFORMATION GATHERING						INTEGRATED MANAGEMENT					
	Registration	Certification	Permitting	Safe Exposure Levels	Labelling	Discharge/Emissions Criteria	Sampling/Testing	Quality Control for Equip/ Procedures	Analytical Capibility(labs)	Environ. Monitoring(labs)	Env. Health(epidemiologists)	Information Management	Enforcement Capabilities	Executive Order	Law	Regulatory	Advisory	Inspections	Siting Violations	Civil Penalties	Criminal Penalties	Litigation	Crisis Response	Containment/Clean up	Investigations	Public Information	Damage Assessment	Chemical Data	Disease/Illness Incidents	Env. Quality Data	Business/Economic Data	Waste/Manifest Data	Management Info. System	Planning	Program Evaluation	St. Interagency Coord.	Public Participation	Fed.-St.-Local Coordination	Working with Industry
Extraction(mining)of a) chemical*																																							
b) waste																																							
Manufactring/Processing/ Reprocessing of a) chemical																																							
b) waste																																							
Import/Export of a) chemical																																							
b) waste																																							
Packaging(for use, sale, storage, or shipment)of a) chemical																																							
b) waste																																							
Transport - Intra and Interstate of a) chemical																																							
b) waste																																							
Application or Use of (end use product) a) chemical																																							
b) waste																																							
Storage of a) chemical																																							
b) waste																																							
Disposal of(final) a) chemical																																							
b) waste																																							

* chemical is defined as a raw material, intermediate product, by-product, catalyst, or final product

IV. STATE GROUPINGS

Analytical Descriptors

In order to determine approaches involved in building a toxics integration strategy, which states are progressing toward that end and their relative progress, the implied needs of states in managing toxics, and in order to suggest state and federal activities for enhanced toxics integration, five descriptors, or management factors were identified and each state was thereby examined. This enabled the grouping of states into three broad management categories, as well as intergroup contrasts and intragroup comparisons.

The five factors are: interagency management mechanisms; health effects monitoring and studies; information gathering, computerization of data, and individual environmental or toxics programs. These consist of:

- Interagency Management Mechanisms: activities designed to foster coordination, cooperation and communication among all relevant environmental agencies, and the integration of like programs and activities among them. Three basic mechanisms emerged: *formal, permanent committees, commissions or processes; ad hoc temporary task forces; and functional integration.*

- Health Effects Monitoring and Studies: necessary for the identification and targeting of toxics control needs. We looked at whether states engage in epidemiological studies, toxicological investigations or other health effects research. In addition, we examined whether states are systematically collecting occupational or public health data that could be used to monitor disease and illness trends possibly rooted in environmental pollution (e.g., cancer or birth defects monitoring) and other data useful for epidemiological research.

- Information Gathering: concerning dangerous chemicals production and/or use (e.g., hazardous waste generation inventories, pesticide use information, chemical manufacturing and use inventories). This type of information gathering is differentiated from environmental monitoring as all states collect air and water quality data, and health effects data reviewed as part of factor #2.

- Computerization of Data: involves the extent to which states computerize or are planning to computerize any dangerous chemicals related data (e.g., chemical production/use data, hazardous waste reporting requirements data, environmental health data, and monitoring data). We also examined whether states are using federal or private computerized data bases or are planning to do so.

- Individual Evnironmental or Toxics Programs: this factor concerns the examination of state activities in implementing seven major environmental control programs -- clean air, clean water, safe drinking water, hazardous waste, pesticides, transport, and occupational health and safety. We assessed where each state stands in relationship to others, and in relationship to achieving federally delegated authorities, i.e., assumption of basic enforcement responsibility. Although, the federal government is adding more requirements for which the states are being asked to assume enforcement responsibility, we limited the examination to relative state progress in assuming basic responsibilities and not the additional delegations. For example, highly developed states with regard to RCRA would be those that have reached the stage of applying for interim authorization from EPA; for the clean air program, highly developed states are considered those that have assumed enforcement responsibility for the federally designated air contaminants but not necessarily the PSD or auto emissions components. The level and extent of concern manifested by specific activities for controlling toxics programs is also a major consideration in analysis of this factor.

The analysis of state practices according to these five factors yielded the impression that states fall within three basic categories we designate as "Group X, Y and Z States." Although there are overlapping areas where a state might easily be placed in one group or the other, and it should be remembered that each state is unique, their broad grouping facilitates analysis of their needs and subsequent design of viable federal-state action plans for integrated toxics management.

Group X States

This section examines Group X states according to the five factors delineated above. States that can be characterized by the following description include Arkansas, California, Illinois, Maryland, Michigan, New Jersey, New York, North Carolina, Oklahoma, Puerto Rico, Virginia and Wisconsin.

1. Interagency Management Mechanisms: Toxics integration strategies and use of a *permanent committee, commission or process* to implement the strategies characterizes the twelve Group X States. The strategy and the structure ensure that:

- environmental problems and activities are integrated among programs, agencies, and governments;
- attention is focused in the area of toxic substances control, and systematically incorporated into overall environmental management;
- a long-term, mitigative philosophy is fostered with emphasis placed on protection of human health;
- the costs and benefits of controlling the manufacture, use, transport, and disposal of toxic substances are actively considered.

Details of each strategy are documented by state in Section IV. A brief comparison of the strategies, however, is useful here in order to understand how they are implemented at the state level and what aspects are important with regard to development of a toxics strategy. Although strategy approaches vary among the states, we can compare their status of development, degree of official support, coordinating mechanisms used, and the cornerstones of each strategy.

Status of Development: Arkansas, California, North Carolina, Oklahoma, and Puerto Rico are in the initial planning and/or early stages of development, having been involved in toxics integration work for approximately one to two years. Illinois, Maryland, Michigan, New Jersey, New York, Virginia, and Wisconsin have more firmly institutionalized the strategy within state government operations, having been involved in toxics integration work for two to three years. This latter group of states recognizes, however, that further developmental work is necessary in order to elaborate already existing features and expand strategy activities to include more sophisticated elements.

Degree of Official Support: Arkansas, California, Maryland, Michigan, New Jersey, North Carolina, Puerto Rico and Virginia receive strong and direct support from the Governor. In most cases, it was through the Governor's executive order or directive that the strategy took form. The other state strategies receive indirect support from the Governor's office, i.e., through issuance of executive orders in support of certain strategy elements, signing off on budget amounts or pushing for specific pieces of legislation in support of strategy elements. In addition, New Jersey and Maryland reported strong support for their strategies on the part of the state legislature.

Coordinating Mechanism: Three types of coordinating mechanisms emerged from the comparison -- Type I: Interagency Committee or Council; Type II: Line

Agency or Program; and Type III: Combination of Interagency Committee and Line Agency/Program.

States using Type I mechanisms include: Arkansas (Toxic Substances and Hazardous Materials Policy Committee), California (Toxic Substances Coordinating Council), Maryland (Council on Toxic Substances), North Carolina (Interagency Coordinating Committee), and Virginia (Toxic Substances Advisory Council).

These interagency committees or councils consist of state agency representatives covering the environmental areas of air quality, surface and drinking water quality, hazardous waste, pesticides, transport, public and occupational health (medical and environmental health orientation), economic or industrial development, emergency services, natural resource development, and laboratory services. Some noteworthy variations to these include: Maryland's Council includes representatives from the state planning agency and state legislature, labor, business, academia, and medical professions; North Carolina's Committee includes representation from the state planning agency and state justice department; Virginia's Council includes five governor-appointed citizens from the fields of agriculture, medicine, labor, industry, and local government.

The principal role of these committees or councils involves providing overall coordination and clearinghouse services for those agencies and their programs implementing integral parts of the strategy. Duties usually include all or a combination of the following: devising tools for enhancing integration and unification of environmental management functions where appropriate; providing a forum for increasing communication and information sharing on a regular basis; advising the Governor and state legislature on toxic control problems and making recommendations for changes; promoting long range planning initiatives; providing guidance to specific toxics related programs; networking with all relevant state government units, local government, federal agencies, private industry, public interest groups, and the general public; ensuring that economic impacts of actions are considered; planning, designing, and ensuring implementation of policies, procedures and organizational arrangements appropriate for the strategy and reviewing them as needed. For specific toxics issues, committees or councils usually create subcommittees out of their membership or by drawing from other state agency personnel as appropriate. Line agencies and operational units carry out the strategy activities on a day to day basis and feed back problems and concerns to the council or committee.

States using Type II mechanisms include: Illinois (Environmental Toxicology Program), New Jersey (Program on Environmental Cancer and Toxic Substances and the Office of Hazardous Substances Control), New York (Office of Toxic Substances), and Wisconsin (Environmental Epidemiology Section).

These line agencies and programs are charged with providing overall coordination and leadership for the development and implementation of the strategy and maintenance of ongoing flow of communcations with other operating units involved in carrying out the strategy activities. They operate as a focal point within the state bureaucracy for interaction with federal agencies, industry, citizens, and the research and medical community involved in toxics. These agencies and programs have day to day operational responsibilities in toxics control as well.

Type III mechanisms are used by Michigan (Toxic Substances Control Commission consisting of non-state personnel appointed by the governor and the Office of Toxic Materials Control); Oklahoma (Pollution Control Coordinating Board made up of state representatives covering a wide range of environmental areas of concern and the Environmental Epidemiology Service); and Puerto Rico (Interagency Hazardous Waste Task Force consisting of state representatives from various environmental program offices and the Solid and Hazardous Waste Office).

These states use a combination of Type I and Type II mechanisms. The policy commission/board/task force makes recommendations to the governor and state legislature on problems and organizational or legislative changes needed. The line agency/program, however, provides a central point of contact for day to day activity implementation ensuring that there is an inter-disciplinary, multi-media and multi-agency approach among operating units involved in the environmental and health aspects of the toxics strategy.

Strategy Cornerstone: Cornerstones are the key elements or activities upon which the strategy focuses at the present time. Although in general all Group X states engage in all the listed cornerstone activities, among many others each state appears to place greater emphasis on one or two elements in particular. The cornerstones provide us with an image of each state strategy by which we can pinpoint those developing expertise in one area or another.

Arkansas emphasizes the establishment of a framework for decision making, prevention and control upon which deverse activities of participating agencies can be coordinated and focused consistent with existing expertise, resources, and statutory authorities. Fostering intergovernmental coordination and cooperation, establishment of information management systems, monitoring and assessment of environmental and public health trends, designing prevention and control programs, and improving crisis response capabilities are key areas of involvement within the framework;.

California's cornerstone is two fold: reducing the overall use of toxics and waste generated from toxic materials and enhancing state clean up capabilities to minimize health and environmental risk of accident. The state stresses information exchanges, use of penalities for violations and providing incentives to industry for gaining compliance in the overall effort to control toxics;.

The development of two-way communications networking among state and federal environmental and health agencies, the research and academic community, physicians, hospital administrators, and other health professionals constitutes the backbone of the Illinois strategy. The goal is to enhance coordination and increase the probability of early warnings of imminent environmental health problems based upon a comprehensive program of environmental health and epidemiology;

Maryland's strategy cornerstone involves a preventative disease control program for minimizing occupational or community exposures to industrial related hazards based on the expertise of an investigative unit and consultation service utilizing teams of medical, nursing, industrial hygiene, and epidemiological personnel. Core activities include field diagnosis of health hazards posed by emergency incident exposures, high risk population epidemiological studies and the monitoring of illness and disease trends (e.g., cancer registries and other reporting tools);

Maintenance and updating of the Critical Materials Register and the development of an Air Priority Chemical Register characterizes the strategy cornerstone of Michigan. The gathering and analysis of chemical production/use, discharge/emissions and health hazard data provides the springboard for state agency work in controlling dangerous chemicals.

The cornerstone of New Jersey's strategy is two-fold: information gathering and analysis based on extensive monitoring of toxics in the various media and chemical inventory materials; and the development and improvement of testing, sampling and chemical screening protocols.

North Carolina's cornerstone involves the development of an interactive computerized management information system integrating diverse types of information including chemical production/use, environmental quality, monitoring, and population/demographic data, and the incorporation of federal and private computerized data bases.

New York emphasizes the development of technical procedures (e.g., testing, sampling and screening protocols) that will enhance its environmental monitoring program and which will have state-wide applications for locating past and present sources of toxic substances contamination, assessing their impacts and developing management techniques for their control. Development of techniques especially suitable for local government application is of particular importance;.

Oklahoma's cornerstone centers around the environmental epidemiology program and its two basic component activities: assisting persons accidently contaminated by toxics in the home or workplace, especially for major emergency/accident situations warranting advice on potential human health hazards; and analyzing environmental health data through epidemiological techniques;

Puerto Rico emphasizes the designing of its strategy to support the prevention of the occurrence of major pollution problems, the mitigation of future crises that may result from environmental trends in environmentally-related diseases and the institution of management mechanisms for the expeditious handling of health and environmental emergencies when they cannot be prevented;

Virginia's strategy cornerstone involves the collection of chemical production/use information, its evaluation in relationship to health hazards and its dissemination to industry and the general public;

Health effects surveillance and environmental epidemiology constitute the key components of Wisconsin's strategy. The state's indepth case study of formaldehyde vapor problems through use of epidemiological techniques may provide protocols for other similar investigations.

The five states whose strategies are in the early developmental stages and the seven states that have stronger strategies in existence vary in their needs. The former could use concrete suggestions as to how to operationalize strategy elements already designed and how to design those only planned. The latter group have gained insight from more practical experience. Their lessons learned could help the former states in their plans. The latter states could benefit from tools to evaluate the effectiveness of what has been done so far.

Official support for the strategy seems to be an important element especially with regard to the governor's office. Building a strategy and administrative structure to carry it out is a management-oriented activity as opposed to line item programs and activities for which support is usually present in the legislative branch. How the strategy is funded was not a direct area of inquiry. It appears, however, that financial support is primarily for actual projects or program activities as opposed to the strategy itself or the coordinating mechanisms which are more often supported through staff time devoted by agency personnel having other day to day environmental responsibilities. This may be an advantage as the line agency/program element probably receives a line item appropriation from the budget. Only two states reported direct support for the strategy from the legislature. In addition, only one state has state legislators as members of the coordinating committee. This may be an area for exploration on the part of the other X states.

The various coordinating mechanisms apparently have wide representation from a variety of state agencies concerned with toxics control. As toxics problems touch so many agency activities with many of them not even realizing it, it is of great importance that broad representation exist so that all angles of toxics control can be explored in an organized, regular fashion. Importantly, these strategy states clearly recognize the need to integrate environmental and health concerns. Their coordinating mechanisms and various toxics activities are evidence of this.

In addition, these strategy states include representation from industrial and economic development and natural resource development state agencies. Toxics control activities are often at odds with the promotion of economic and industrial growth. Input from the agencies concerned with these elements is vitally important for cohesive policy development and implementation. Balancing of economic development and environmental protection needs can potentially be better addressed when the responsible agencies are regularly brought together to learn and understand their various perspectives.

Inclusion of the emergency services personnel is important as they need to be aware of the long-term hazard implications of toxics contamination and emergency health concerns of hazardous materials incidents that go beyond the scope of emergency medical services.

Representation from state planning agencies is conspicuously missing in all but two states. Given the fact that long-range planning is an element of toxics strategy, the planning personnel could provide valuable input.

Intergovernmental coordination between state and local levels needs to be fostered in an integrated strategy. Few of the coordinating mechanisms evidence local government representation, although they usually function as a focal point for interacting with local government agencies. How this is actually accomplished on an operational level remains to be determined. The same is true for integrating activities with the federal government. Although X states are working toward these ends, information flows among state-local and state-federal counterparts do not seem clearly defined. Group X States, however, have instituted within their organizational structures a formal, centralized entity through which toxics information can flow between and among the three governmental levels - local, state and federal.

With regard to *ad hoc, temporary task forces,* many of the Group X States, especially Type I states, use subcommittees formed from membership of the coordinating mechanism, rather than miscellaneous task forces for studying specific issues such as economic impact, health effects and toxic waste. As such, their formation can occur in an orderly structured manner.

Although in general, these states are not characterized by a proliferation of ad hoc task forces, some do exist. They tend to focus on very specific component parts of toxics control, and while not falling under the direct auspices of the coordinating mechanism as subcommittees do, they are geared toward coordinating with the overall toxics committee or council. Some are organized through the governor's office (mostly those concerned with hazardous waste issues), while others are organized for intra-departmental concerns. Some are only made up of a small number of state officials, while others are solely made up of citizens from the private sector - industry, business, public interest groups, the general public. Several interesting ones follow:

Maryland's Hazardous Substances Advisory Council is composed of representatives from the Department of Agriculture, University of Maryland, Department of Licensing and Regulation, Department of Health and Mental Hygiene, as well as representatives from the hazardous waste industry and two public citizens. This Council makes recommendations as to what substances should be designated as hazardous and listed for the purpose of hazardous waste and transport regulatory action pursuant to the state Dangerous Substances Act of 1976;

Arkansas's Technical Advisory Committee on Hazardous Waste Management is independent of the Governor's office and state bureaucracy and is composed of industry representatives, university officials, a mayor, and an attorney. The Committee examines state functions in hazardous waste management, delineating them and recommending ways to enhance their coordination as well as making recommendations on laws and regulations for hazardous waste management;

Michigan's Groundwater Enforcement Task Force is an inter-agency group formed to enforce the state's policy on priority problem sites, identify responsible parties to clean up contamination, require hydrological studies be done where appropriate, halt and/or require reduction in contamination where sources can be identified, and investigate and initiate remedial action.

Maryland's task force provides for interagency involvement in designating what substances are hazardous. Importantly it allows for discussion of "hazardousness" of various substances from different perspectives - agriculture, medicine, public and occupational health, and environmental quality so that the varying costs and benefits or regulating and hazards of not regulating a particular substance can be weighed.

Task forces (e.g. Arkansas) that review state government functions and practices in a specific environmental area (e.g., hazardous waste) can help to identify and delineate appropriate agency roles, discover gaps and overlaps and develop mechanisms to address them, and recognize areas where integrative activities could be instituted.

An interagency enforcement task force can foster an integrative approach at the operational level and enhance identification of repeated violators of laws that are handled by separate agencies. This is especially true of areas like groundwater whereby polluters may be regulated by surface, drinking water and/or hazardous waste programs.

Many Group X States engage in interesting *functional integration* efforts that constitute part of their respective strategies. For example:

Wisconsin's Bureau of Water Quality and the Hazardous Waste Management Bureau are developing a joint approval process for pretreatment of chemical discharges based on examination of effluents and NPDES permits;

NPDES permits in Michigan are systematically reviewed by the Office of Toxic Materials Control in order to be sure that toxics information collected through the Critical Materials Register is considered when issuing permits;

Arkansas conducted an extensive state agency functional review, examining laws, resources and expertise in the state for environmental management and toxics control. The review resulted in a report to the Governor on the need for a toxics integration strategy and recommendations on how it should be established;

Oklahoma's Pollution Control Coordinating Board is charged by law with the function of examining the state of environmental management and making recommendations on existing overlaps, gaps and inconsistencies with regard to authorities, activities, organizational structura, and resource use. Annual reports documenting their findings are submitted to the state legislature;

Virginia's Toxic Substances Advisory Council prepares an annual report for the Governor on the status of toxics control in the state. It includes an appendix on toxics-related agency and program activities, serving as an annual "inventory" of state toxics management.

Permanent or planned *information-sharing mechanisms* are also characteristic of Group X States. Information clearinghouses, educational projects, newsletters, hazard alerts, memoranda of understanding, and communications networks are used to facilitate state agency exchanges of information and dissemination of knowledge to the public provide useful tools. For example:

California's Environmental Data Center acts as a clearinghouse of "information on information," i.e., staff provide reference and referral services to the general public and state agency personnel to assist in their locating the most appropriate source of information to answer their questions. The Center maintains a hard copy and on-line catalogue of information sources in annotated bibliographic and geographic formats. In addition, it handles central distribution of some state documents for which the state has no other established distribution system. On occasion the Center performs some short-term research to answer an inquiry if there exists no readily-available source of information;

New Jersey's Toxic Substances Resource Center was created as a central repository for various kinds of toxics information including conventional library materials, in-state and out of state developed materials such as research documents, hazard maps, chemical inventory data, monitoring and environmental quality of data. The state plans to computerize data and provide on-line information search and retrieval methods, and an on-line catalogue referencing the resources of the Center. The UPGRADE data base is a core component;

Oklahoma maintains a central repository of state-generated environmental documents at the educational Center for Ecology Information, East Central State College for use by the public. The state's Environmental Epidemiology Service is also building and maintaining a toxics reference library including an extensive contact persons list of federal and state experts in environmental and health related problems.

Maryland's Health Education Center is planning a health education program covering aspects of environmental cancer protection for occupational, community, professional and school groups;

Oklahoma conducts state-wide workshops in poison prevention, use of pesticides and other household hazardous substances;

Arkansas would like to conduct or sponsor seminars and information programs on the handling and use of toxics substances in industry, agricultural and household settings;

Maryland issues Toxic Substances Advisories to alert industries to substances that are known or suspected carcinogens;

Oklahoma's Environmental Epidemiology Service disseminates fact sheets, prepares public information materials and news media items on toxics;

Virginia issues Health Hazard Alerts to affected parties on newly reported toxic effects or widespread misuse.

Michigan is using memoranda of understanding (MOU) to enhance information sharing between state agencies at the express direction of the Governor's office. The MOU delineates relative state agency responsibilities where overlaps or confusion exists. It mandates that each signatory designate a focal point for toxic substances information exchange for routine requests and notification of accidents. Focal points are responsible for communications flow and updating each other on progress achieved on a day to day basis as well as emergency situations involving toxics. In addition, personnel designated as the focal point are mandated to exhange toxic substances program proposals prior to their submission to the state budget office. The signatories and their focal points are Department of Agriculture (Office of Toxic Substances and Emergencies), Department of Public Health (Chemicals and Health Center), Department of Natural Resources (Office of Toxic Materials Control), and the Toxic Substances Control Commission (administrative office).

Illinois would like to establish a systematic, organized communications network. The goal is to develop a two way information flow between state environmental and health agencies and those in the field (e.g., doctors, veterinarians, hospitals, coroners, local health directors, state field investigators) on human and animal illness or death related to toxic exposures. Systematic documentation of field investigation results, routine and special reports of environmental monitoring, and results of toxic substances research and epidemiological studies would be required. Three tasks outline the initial scope of the planned project: identifying all agencies, institutions, groups and relevant contacts with whom information-sharing should take place on a regular basis; compiling a guide of relevant programs documenting research, laboratory, data management and investigative capabilities of contacts listed; and developing a workshop for participating network personnel to describe logistical considerations for collecting and sharing information.

Functional integration efforts such as these represent specific operational level activities that implement the integrative concepts fostered by the coordinating mechanisms and strategies. Without such efforts, toxics integration would remain theoretical.

Joint approval processes for pretreatment needs and systematic, formal permit reviews especially those that include the "toxics bureau," enhance the opportunity for a variety of agency input so that important concerns will not be overlooked.

Environmental agency functional reviews and annual reports can delineate and uncover gaps, overlaps and inconsistencies in laws, programs and activities and help to ensure that toxics control is the key thread of relevant strategy programs. Annual reports especially can provide the starting point for evaluation of strategy effectiveness and provide an "inventory" tool for maintaining state-wide awareness of toxic control initiatives and authorities available for use when the need arises.

Maintaining central repositories of information or reference and referral services constitute a basic clearinghouse function. Such information management mechanisms can assist the state policy makers especially when there is no time to waste in searching for information needed to make decisions efficiently, effectively and quickly.

Mechanisms for the state to consistently share information with industry and the citizenry can enhance integration and should be designed to provide mechanisms for feedback of information and concerns from non-state to state agency entities.

A better informed public can help decision makers by providing a more rational political climate in which to make decisions. Educational programs, newsletters and hazard alerts can assist in enhancing the protection of public health and encouraging a more cooperative spirit between industry and the state. Often, chemical misuse is a result of the lack of knowledge on how to safely produce, handle or use a particular product not only on the part of the general public and household chemical products but also on the part of industry, especially those using chemicals in their industrial processes for which adequate labelling is lacking.

Memoranda of understanding can be effective in instituting interagency information sharing not only when it is of crucial importance during crisis situations but also on a day to day basis. Ensuring that information circulates among appropriate personnel who need to know, can make use of and in turn provide input is a very important aspect of networking.

Two-way information flow of the kind proposed by Illinois is an valuable element for a toxics strategy. Often information flows from the state agency to the field, and not vice versa. Systematic feedback of field information is especially important for health and illness data gathering needs. Relying upon people to automatically do so results in sporadic, inconsistent and often unreliable flows. Encouraging awareness of information needs and providing for direct and regular contact can help improve the situation.

2. Health Effects Monitoring and Studies: All Group X States place a high priority on monitoring health effects and on performing individual health effects studies. Environmental epidemiology and toxicology play key roles in their respective strategies. The following examples illustrate the extensiveness of the work of X States as a whole in this area, while providing a checklist of possible tasks states not heavily involved in health effects work may want to consider performing:

Health effects monitoring is accomplished by the following type of activities in states:

- routine biological testing of children for blood lead levels (Maryland and Wisconsin)'

- periodic review of adult blood lead reports submitted by laboratories throughout the state, abnormal levels are followed up by physician's obtaining additional clinical and occupational data (Maryland);

- occupational diseases are monitored through reports submitted according to law, combined with a cross-checking review of workmen's compensation claims (Maryland); monitoring of worker exposure to carcinogens through reporting requirements mandated by law (California);

- engagement in various activities for which medical response units or investigative teams of physicians, biostatisiticians, monitoring experts, epidemiologists, Laboratory personnel, and environmental health professionals provide field analysis and monitoring of health effects of victims of pollution incidents and emergency accidents (toxic spills or leaks) or those complaining of home or work related exposures. Tasks performed include site visits, sampling, review of medical records, provision of toxicological and medical information to physicians treating victims exposed, and provision of advice to clean up personnel regarding health concerns (Maryland, Illinois, and Oklahoma);

- monitoring of disease incidence, mortality or morbidity trends through use of currently available information (e.g., National Cancer Institute statistics) and state documentation; diseases observed include cancer, birth defects, cardivascular, congenital heart and circulatory abnormalities (Maryland, Michigan, New York, New Jersey, Illinois, and Wisconsin);

- evaluation of potential health hazards related to chemicals listed in production/use inventories and attempts to identify sources, levels and duration of human exposures of populations potentially affected; statistical correlations observed between chemicals and illness or disease incidence for a given geographical area (Maryland, Michigan, New York, New Jersey, Virginia, and several states planning to do so);

- implementation of a systematic reporting, surveillance and investigative system for industrially-related diseases (Maryland and Virginia); institution of an automatic cancer and birth defects surveillance system (Wisconsin);

- monitoring of trends in hospitalization related to toxic exposures (Wisconsin).

Health effects studies are carried out in various ways:

- general studies of disease patterns among high risk groups and their relationship to other data collected such as chemical inventory, environmental quality and epidemiological study data in an attempt to document statistical correlations and apply epidemiological techniques (Maryland, New York, New Jersey, and Illinois);

- epidemiological study of health effects of a community exposed to fluoride in the ambient air emitted from an aluminum smelting plant during which an attempt was made to find correlations between health data collected and results of air and water sampling of the surrounding environment (Maryland);

- health surveys or small scale studies of workers and the immediate community exposed to a variety of hazards potentially being caused by hazardous substances emissions or discharges (e.g., lead exposed workers of a solder grinding operation of an auto plant), specially developed questionnaires were designed to obtain detailed information on worker practice and personal hygiene and personal health data, physical exams were performed, blood lead samples taken and analyzed, and plant engineering deficiencies discovered (Maryland);

- study of PCB levels in citizen's blood entitled "Evaluations of Changes of the Level of Polychlorinated Biphenyls (PCB) in Human Tissue" in which a comparison of PCB levels in the blood of fish eaters and that of non-fish eaters pinpointed a direct relationship between size and quantity of Great Lakes fish consumed and PCB levels found in human blood, although no health or medical problems could be directly attributed to such levels (Michigan);

- study of the relationship between PBBs and human breast milk from researchers confirmed that almost 96% of nursing mothers in the area studies had at least a trace level of PBBs in their milk (Michigan);
- epidemiological study of miscarriages and birth defects of those living near Love Canal (New York);
- statistical study attempting to find correlations beween the health risks posed by chemicals and community, occupational, social, or environmental variables (New Jersey);
- case studies of lead contamination, toxicity in the air resulting from a fire, explosion at a waste treatment plant, and leukemia cluster in a school for which an epidemiological study was done to define casual linkage (New Jersey);
- epidemiological studies of leukemia, lymphoma and multiple meloma and a 20 year study of households adversely affected by the chemical lindane (Illinois);
- study of persons exposed to the highly toxic chemical organophosphate during a chemical fire incident (Illinois);
- formaldehyde vapor study whereby dose response relationships and correlations with human exposures are to be done (Wisconsin);
- study of pulmonary diseases and their relationship to industrial areas emitting a high level of particulate matter (Puerto Rico);
- study of health risks faced by employees and the immediate community as a result of exposure to birth control pills apparently creating changes in sexual characteristics (Puerto Rico).

Systematic collection of health effects, toxic exposure and disease incidence data is vitally important for a comprehensive toxics strategy. Statistical correlations between environmental quality and health data, application of epidemiological techniques in the study of environmentally-caused diseases and observance of trends between illness and highly industrialized areas where toxic exposures may be the cause are impossible tasks without appropriate health data. Establishing baseline health data against which changes can be measured and potential cause and effect determined is vital.

Most efforts to date, however, involve collection, compilation and analysis of cancer data. Very little data for other potentially environmentally related illinesses/diseases are available.

Regular testing of children and adults for the presence of chemicals in the blood and body tissues is generally lacking among all but a couple of X States. Occupational work exposures are regularly reported to a few of the states. Efforts in these two areas apparently need intensification.

Although in general X states are further along in these areas than most states, much remains to be done. Systematic reporting mechanisms for state and national health data appropriate for environmental health study are needed to further progress already made by these states. Efforts by some states in this regard must be shared with counterparts in this grouping who are ready to utilize their experience gained to date.

Legal mandates governing physician reporting requirements, cancer and other disease registries, and industry reporting requirements with regard to worker exposures are tools some states are using and remain tools other states in Group X may need to institute.

3. Information Gathering: All Group X States collect hazardous waste generation data and/or pesticide production/use data. In addition, these states show extensive chemical production/use data gathering efforts underway or planned. For example, five states (Maryland, Michigan, New Jersey, New York, and Virginia) document the collection of data through chemical inventories or industrial production/use surveys. Three additional states are planning to do so (Arkansas, North Carolina, and Puerto Rico). Highlights of these chemical inventories follow:

Maryland's Toxic Substances Registry identifies producers, users, handlers of 150 selected known or suspected carcinogens. Data is collected on quantity, composition, methods or treatment or disposal of waste generated therefrom. Information gathered is routinely used by other program areas, e.g., in prioritizing monitoring and control efforts, health effects studies and correlations with permit data;

Michigan's Critical Materials Register is developed through state preparation of a list of substances for which data must be reported. Producers and users of listed substances are required to report annually on uses, discharges and emissions related to the listed substances. The list is derived through literature searches and then further refined through a hazard assessment process based on a priority ranking scheme;

New Jersey has conducted a state-wide survey of industrial usage of approximately 200 selected toxics and carcinogens. Information collected includes data on the manufacture, use storage, processing, packaging and disposal of waste generated by the toxic chemicals. In addition, the state is looking toward incorporating additional data on pollution control devices and waste treatment/disposal practices currently used by major chemical users, i.e., state of the art technology, as well as information on industrial practices related to the emissions of carcinogens and other toxics;

New York completed its industrial chemical production/use survey in 1978. All chemicals are referenced by their chemical abstract registry number and categorized by industry, by county and by watershed;

Virginia's toxic substances registry consists of geographic information on the production and use of chemicals, i.e., raw materials, catalysts, process solvents, and final products, including mixtures. For each chemical the following information is reportable by law: name and location of plant, name and estimated quantity of substance reported. A list of Class I substances is derived through a hazard assessment process and further information must be reported on those listed including name of toxic substance, chemical properties, means of detoxification or decontamination, how emitted, and whether a forseeable health risk to employees is present or risk to sewage treatment/disposal plant operation;

Arkansas is planning to collect information on industrial and agriculture uses of toxics by geographic area and by frequency of use;

North Carolina is planning to develop a profile of chemical substances produced, used, stored and accumulated as waste in the state. Data to be collected includes plant location, size of the plant, amount produced or used and composition of the chemicals. 1,000 chemicals will be then selected for preparation of detailed background summaries and each chemical will be rated according to volume produced or used, volume produced by county and severity of health or ecological effects;

Puerto Rico will also develop a chemical materials registry to identify existing and potential high risk industrial processes for prioritizing environmental control program activities;

California's collection of commerce-related data on industries using carcinogens;

Michigan's collection of information on the distribution and use of PCBs;

Virginia's collection of production and use data on paints and PCB content of sewage must be reported.

4. Computerization of Data: Group X States are relatively sophisticated in data computerization. Program managers apparently make use of, or are planning to develop for their use, appropriate computerized data bases.

Seven states reported having operational computerized data bases for environmental monitoring, chemical inventory, reference and referral catalogue, manifest system, pesticide use, and/or toxicological data. The five states compiling chemical inventory data have computerized this information as well as health hazard assessment data.

Oklahoma is planning to computerize its *waste inventory* and manifest data; *Puerto Rico* is planning to computerize its *pesticide data*; and *California* will be establishing a computerized state-wide *water quality information system* and a *wastewater information* management system.

Considerable efforts to institute comprehensive, computerized management information systems are under way or planned in some states.

Illinois's plans for a data management and evaluation system involve the incorporation of capabilities for the storage and retrieval of data, analysis of information entered, adding of other existing data bases, geographic mapping of morbidity and mortality data, and routine scanning from an epidemiological perspective. The state will develop a systematic reporting system to facilitate data entry;

Michigan will be expanding its *computerization* of Critical Materials Register data to include the capability to sort, retrieve and analyze data, perform statistical correlations, incorporate secondary data sources such as NPDES permit information, environmental quality data, federal computerized data bases, and premanufacture notice information pertinent to the state collected by EPA. The state would like to be able to store and retrieve the data by geographic area and specific materials by type and quantity used;

North Carolina wants to develop an interactive management information system that would include the chemical profile data, groundwater quality data (i.e., geologic, hydrologic and soil base information), river and stream quality data, population and demographic data, existing state and federal data bases, manifest system information;

New Jersey would like to expand its already existing computer capability in using UPGRADE as a core component and incorporating additional information on environmental quality and monitoring data, health effects information and other federal data bases such as MED-LINE, TOX-LINE, CANCER-LINE, OHM-TADS. The expanded computerized system would be a core component of the Toxic Substances Information Center;

Wisconsin wants to develop a rapid access data base that would allow them to answer questions on toxic substances exposures and investigate/study multiple toxics problems. In addition, the state would like to develop a computerized cancer and birth defects surveillance for automatically indicating abnormal occurrences of these diseases;

Arkansas is considering the development of a comprehensive computerized data management system that would incorporate the following: medical, toxicological and epidemiological data; exposure information resulting from consumer end use; cancer and birth defects registry data; food and public water supply contamination data; industrial emission data; information on industrial and agriculture use of toxics, environmental quality data; all state survey information including manifest system reports; and all related permit data. Consideration will be given to relevant federal data bases such as OHM-TADS, CHEM-LINE, TOX-LINE, STORET, and SAROAD.

Half of the X States currently use federal data bases as an integral part of their toxics programs. For example: New Jersey and Illinois extensively use UPGRADE; Michigan and Maryland report use of TOX-LINE, MED-LINE, and CHEM-LINE as well as others; California uses STORET in addition to others; Virginia also uses a variety of federal data bases and several states report use of CHEMTREC and OHM-TADS. As mentioned above, those states planning comprehensive management information systems are considering the feasibility of incorporating federal computerized data bases as appropriate.

5. Individual Environmental Programs and Toxic Activities: About ten of these states have assumed basic enforcement responsibility for six of the seven environmental programs, while the other Group X States have assumed it for five of the programs. The systematic infusion of toxics integration, documentation and control efforts characterizes Group X States.

Many of the X States have excelled in certain program areas not already discussed. Sophistication in these program areas is necessary for a viable strategy and the fact that many of these states show relatively strong activity in various areas demonstrates their inclusion in the X category.

The following highlights illustrate the diverse ways X states encourage and incorporate toxics control activities into environmental management. Examples chosen are those which appear most interesting and are not necessarily part of each and every state strategy, but could be. This could be useful to all states as a tool for reviewing their respective toxics activities and determining whether their toxics involvement is adequate. We have grouped like activities under the general categories: definitions, monitoring, testing procedures, laboratory capabilities, standards development/use restrictions, permitting, emergency response, and miscellaneous activities.

A few X states define terms in such a way as to be more inclusive and less parallel to their federal counterparts, while being substantially equivalent. Broad definitions of what is to be regulated can help to minimize gaps in authorities. This is especially true of potential emergencies not viewed as severe crises for which broad emergency health powers cannot realistically be used to control the situation and specific laws narrowly defining what can be regulated do not cover the substance of concern.

Definitions that can be used for any and all aspects of environmental protection, rather than having different definitions for each type of regulatory activity (e.g., hazardous waste disposal, transport, chemical manufacturing, pesticides, water pollution), may help with regard to intergrating environmental program activities as it would provide a common basis from which to work.

Maryland's Dangerous Substances Act of 1976 defines hazardous substances as "any matter that conveys toxic, lethal, or sub-lethal effects to plant, acquatic, or animal life, or which may injurious to human health, or persists in the environment, or which causes sub-lethal alterations to acquatic, plant or human systems through their cumulative or immediate reactions." Although this definition pertains primarily to state hazardous waste and transport regulatory actions, it provides a broad and potentially all-inclusive framework for regulating pollutants. The state further delineates what is hazardous by a listing process using the various federally-regulated substances as part of the list as well as having state-designated substances listed;

Virginia's Toxic Substances Information Act includes a relatively comprehensive definition of toxics: "any substance including raw materials, intermediate products, catalysts, final products, or by-products for any manufacturing operation or commercial establishment that has the capacity through its physical, biological, or chemical properties to pose a substantial risk of death or impairment either immediately or over time to normal functions of humans or acquatic organisms or any other animal." Apparently, this definition does not cover hazardous waste. However, all other hazardous pollutants in any form but waste could be regulated according to the provisions of the Act. The Act, however, primarily governs information gathering activities important as a first step toward regulatory action. The state apparently must turn to other laws in order to take regulatory action.

Illinois defines by law acute hazardous waste as "a hazardous waste that has been found to be fatal to humans in low doses or in the absence of data on human toxicity, it has been shown in studies to have an oral LD50 toxicity of less than 50 milligrams per kilogram or an inhalation LD50 toxicity of less than 2 milligrams per liter or a dermal LD50 toxicity of less than 200 miligrams per kilogram or is otherwise causing or significantly contributing to an increase in serious, irreversible, or incapacitating reversible illness." In this, the state is attempting to fill a void in toxicity information that so often makes regulatory activity difficult when data on human health effects resulting from exposures to a particular waste is conclusive or non-existant.

Nearly all these states have better than average toxics monitoring programs. They are monitoring, sampling and testing for the federally-designated or regulated contaminants in addition to other contaminants determined necessary by the state. Strong monitoring activities are an important part of toxics control programs. They provide the environmental quality data so necessary for indicating where problems exist. They provide the data on contamination in the water, soil and air that can be compared and correlated, if possible, with health data to see if there is a cause and effect relationship or a strong indication thereof. The data gathered through monitoring programs is not only necessary for regulating federally-designated contaminants for which standards controlling their discharge and emissions have been developed but are also necessary for determing new harmful pollutants in need of regulatory action.

In addition, improvement of monitoring techniques can speed up the identification of specific problem areas for prioritizing environmental pollution control activities. Pollutant screening methods, computerized monitoring networks, extensive fish-flesh analysis, among other techniques, can prove useful for more accurate and rapid characterization of a state's environmental quality.

Maryland has an ambient air quality monitoring network consisting of 17 automated remote stations linked by telemetry to a central computer that controls the stations and provides real time data display and data processing capabilities. The state's air program monitors concentrations of sulfur dioxide, carbon monoxide, coefficient of haze, photo-chemical oxidant, oxides of nitrogen, wind speed, and wind directions. Maryland also has a mobile air quality monitoring laboratory consisting of a van with two gas chromotographs equipped with 4 different detectors, portable power generators, and an analytical lab. It is capable of determining a variety of ambient air toxics including pesticides, sulphur and phosphorus compounds, low boiling hydrocarbons, and vapors, and can make determinations of concentrations with distance from the source as well as following a plume;

Illinois encourages a team approach toward field sampling of air, water, soil, human and animal tissue. Integrated teams include physicians, biostatistians, monitoring experts, laboratory/analytical staff, epidemiologists, and environmental health professionals;

New York State's fish-flesh monitoring program analyzes a variety of fish species for heavy metals and a variety of chlorinated organic chemicals using over 100 stations covering major waterways on a state-wide basis. Emphasis on fish monitoring is due to the fact that fish concentrate chlorinated hydrocarbons present in aquatic environments that would otherwise be evidenced only in very low concentrations in the water column making it difficult to determine what is present in the water. Extensive use of fish tissue analysis can assist in making determinations more accurately;

New Jersey is compiling an extensive set of data on metals and volatile organics present in the air. Atomic absorption techniques are used to analyzes samples for the presence of lead and other heavy metals. At the same time and places, the state takes samples of volatile organics in the air and analyzes them for selected carcinogens and toxics. Approximately 23 compounds, including routine sampling for lead, manganese, arsenic, zinc, nickle and spot checks for chromium, cadmium and mercury, are monitored for. In addition, the state has an extensive groundwater sampling and testing program for 50 chemicals including heavy metals, chlorinated low molecular weight hydrocarbons, and pesticides;

Illinois's air monitoring program includes sampling for sulfur dioxide, nitrogen dioxide, ozone, carbon monoxide, hydrocarbons, particulate matter and metals such as lead, zinc, iron, copper, cadmium, and arsenic.

New testing procedures or sampling methodologies such as various equipment modifications, improved in-stream bioassays, adaption of in-vitro mutagenicity tests, biochemical, physiological and behavioral study methods, and techniques for computing metabolic and clearance rates for humans provide progressive steps toward overall improvement of environmental quality monitoring and analysis efforts. Improvements in these areas and others can increase the accuracy of monitoring activities, decrease the time spent in localizing problem areas and provide better data for human health risk assessments.

Illinois's work in the study of trace organics in water discharges has resulted in the development of new sampling methodology and the fabrication of a pump for simultaneous quantitative concentration of aqueous samples by several methods. They use mathematical theory of sampling and have developed equipment especially designed to reduce errors involved in collecting samples containing large numbers of organic compounds present at trace levels. In addition to using traditional chemical analyses of samples for priority and other trace pollutants, modifications of the Ames bacterial mutagenicity testing procedure are being researched by the state in cooperation with the University of Illinois and the SIU School of Medicine. To date, the state has used this technique to quantify the toxicity and mutagenicity of a mixture of 11 toxic, mutagenic and inactive compounds in about 50 combinations in TA98, TA100 and TA1537;

Illinois is conducting a pilot study of in-stream bioassay method using a benthic organism and will establish a network of biologic monitoring stations capable of using a combination of biologic data (e.g., pathologic changes, bioaccumulation, water column analytical data, and mutagenic data from extracts of organisms in the samples);

Illinois is working on a methodology for computing metabolic and clearance rates in humans from animal data for independent assessments of human health hazards of compounds already identified through monitoring efforts;

New York is planning to develop chemical screening procedures that screen for toxic effects of mutagenicity or teratogenicity and wants to establish protocol for the Ames test already used on a preliminary basis for screening bottom sediments for mutagenic activity. New York would like to be able to use the Ames test as a scanning method for effluents, sediments, leachate, and biota followed by chemical analyses using gas chromatography and spectroscophy;

New Jersey's short term in-vitro mutagenisis testing for air and water samples whereby the ability to analyze environmental samples for mutagenesis and carcinogenesis through short term bioassays would be useful for reflecting the presence or absence of a wide range of toxics and may provide indications of the synergistic action of chemicals in the environment. Perfection of the test, in addition to statistical studies of health effects, will help the state evaluate health risks of specific environmental contaminants. State-wide screening made possible through this testing protocol would help speed up examination of overall contamination and determination of localized problem spots where carcinogens and mutagens are entering the environment as well as supplement direct risk assessments of pollutants currently done by mathematical extrapolations;

New Jersey is currently performing biological and ecological testing of water to: detect chronic effects of toxics; determine what additional substances ought to be tested for and monitored; and determine whether synergistic effects or other interactions have an effect. The state will be using chemical analyses and also biological and ecological studies in which certain species would be chosen for biochemical, physiological and/or behavioral studies including analysis of enzymes that might be altered by pollutants, physiological measurements of variables known to be altered by stress and behavioral traits known to be subject to modification by chemicals.

Strong laboratory capabilities are necessary for a viable toxics program. This is especially true for the identification and analysis of "exotics" and trace elements of other toxics in the environment and animal and human tissues. Without extensive environmental and health laboratory expertise, the gathering of environmental quality and human health effects data serves a limited purpose and the initiation of control activities would stand on unsure ground. Most X states have better than average laboratory capabilities and several have consolidated environmental-related laboratory services to provide for centralized servicing. Consolidation of services can be useful for facilitating exchanges of expertise among lab personnel, enhancing learning and on the job training/development, cooperation among personnel on complicated and extensive analytical problems, bringing together the environmental contaminant analysts and those most proficient in the analysis of poisons in human tissues, and the cooperative use of sophisticated, expensive equipment.

- Maryland has very extensive and specialized laboratory capabilities and can test and confirm almost an unlimited spectrum of chemical toxicants and carcinogens including nitrosamines, kepone, phenols, pesticides, and other organics. Lab services also include biological testing of humans, i.e., blood lead levels, urine fluoride, asbestos in tittues, hematological testing, and testing for precancerous and cancerous conditions. Only lead is screened for on a routine basis;
- Illinois's Department of Public Health Toxicology Laboratory has received nationwide recognition for forensic toxicology and has extensive experience in pesticide analyses from the various media. The Laboratory is working on new analytical methods to identify substances and trace quantities in human tissues and currently performs routine examinations of body samples to determine manner and cause of death. Samples are analyzed for drugs, poisons and unusual chemicals.
- Oklahoma has laboratory instruments capable of reading very low levels of toxics in the air, water and food.

The development of criteria standards and use restrictions for non-federally regulated contaminants are areas where states can be active in addressing environmental problems unique to the state or a few states, especially where nationally-developed standards for all states may be an unnecessary use of federal dollars and staff time. Other states experiencing similar problems can benefit from a fellow state identifying a need, taking the lead to address the need and spending the "front end time" to devise an appropriate standard or use restriction. Some Group X States are working in this area, the results of which may be of use to other states.

Maryland is now proposing regulations for the control of the use of asbestos-containing serpentine rocks on roads, parking lots and other similar surfaces;

Wisconsin requires most paper and pulp mills to conduct chemical analyses of water effluent;

Wisconsin has developed guidelines for the restricted use of several pesticides - eldrin, deldrin, lindane, chromium, and mercure;

Okalhoma's Water Facilities Engineering Service, through its rules and regulations on wastewater pretreatment requirements and primary standards criteria for public water supply facilities, has established a system by which staff engineers evaluate potential effects of industrial wastewater discharges on sanitary sewers to ensure that the waste does not contain toxics that will kill the bilogical organisms needed for adequate biotreatment of the wastes. Screening of industrial waste with regard to volumes and strength of toxic materials is needed to ensure compatability. Recommendations are made to adjust waste content when compatability is absent and enforcement takes place under local ordinances, if necessary;

Virginia is finalizing regulations governing its industrial ethanol control program. Rules concern the use permitting that will probably affect farmers using ethanol for non-commercial purposes. Regulations also include permitting requirements for the operation of alcohol plants and providing for plant security including rules on required production reporting, maintenance of inventory records and controls, and disposition reporting so as to ensure that alcohol production is not diverted to illegal uses;

Puerto Rico, under its NPDES program, is revising its industrial and municipal water discharge permits to include specific effluent limitations for toxics based on EPA guidelines developed under FWPCA. While implementing pretreatment requirements under Section 307 of FWPCA, the Commonwealth will assess and reduce the contributions of toxics from industrial discharges of wastewater into municipal wastewater treatment systems;

Maryland correlates toxic substances data from NPDES permits with industrial chemical survey data for identification of potential water contamination.

Hazardous materials emergency response is an important element of a toxics strategy. Although X states generally have comprehensive emergency response plans for hazardous materials accidents, several states have pinpointed a deficiency in their overall capabilities to respond and protect the public health. For the most part, emergency medical services is the only medical component present at a toxic spill. Awareness of the need for environmental health professionals trained in recognizing the health effects caused by polluting emissions of, for example, a wastetreatment plant fire, characterizes many of the Group X States orientation toward improving their response capabilities. Determination of the need for community-wide evacuation, monitoring of the area affected for after-incident health effects, providing environmental health advice to on-scene physicians and assisting in the clean up operation to ensure that a health perspective prevails are all areas of concern that are not usually addressed. Several X States are addressing these needs in various ways.

Maryland has a medical response unit designed to respond to health effects problems caused by toxic spills and emergency leaks. Expert teams investigate and supply medical and toxicological advice through site visits, environmental sampling, reviewing medical records of victims, and other environmental health activities;

Wisconsin is looking toward developing an emergency response health plan outlining medical responsibilities that go beyond the traditional emergency medical services activities. The plan would include guidelines on: potential health effects that would necessitate evacuation; medical tests needed to screen for adverse health effects; reporting mechanisms needed to establish early warning for detection of unexpected exposures that might not be manifested until well after the accident is over; after-incident sampling protocol; appropriate government roles for responding to environmental health effects caused by toxic accidents; supplies, equipment and training needs. Maryland and Illinois are investigating similar approaches;

Okalhoma would like to see established state-federal interagency hazardous materials emergency response teams consisting of a coordinator, legal advisor, field inspectors, transport officer, laboratory coordinator, epidemiologist, and a media coordinator;

Arkansas wants to identify high risk facilities and transport corridors for targeting prevention activities;

New Jersey's Office of Hazardous Substances Control systematically reviews all spill prevention plans of major hazardous materials storage facilities. Several states require such plans;

Michigan's CMR is used for determining which facilities must develop pollution incident prevention plans. Each facility using or storing any CMR listed substance must prepare a plan that sets forth procedures on preventing pollution, emergency cleanup methods, surveillance used to detect possible pollution, and methods of keeping inventories. Plans must be made available to employees handling CMR listed substances and all spills of CMR listed materials must be reported to the state.

Group X States engage in some additional activities that may be of interest to others and characterizes the level of relative sophistication attained by this group of states.

North Carolina's eutrophication project addresses the problem of accelerated nutrient enrichment in rivers and estuaries through a system of classifying state waters as nutrient sensitive. The classification carries with it water quality standards on nutrients. In addition, the state is evaluating the trophic status of its waters;

New York is instituting a bulk storage program the control surface or subsurface tanks, mostly holding petroleum or petroleum products, found to be or suspected of leaking and polluting the environment. The program is just starting and consists of the following elements: identifying environmental problems and hazards caused by leaking bulk storage tanks; preparing or certifying criteria for siting, fabricating, installing, monitoring, testing, replacing, rehabilitating, and abandoning tanks; preparing statewide regulatory programs for preventing leaks; informing industry, local officials and public on the environmental problems and hazards caused by tanks; and encouraging local governments to exercise control with regard to siting and installation of bulk storage tanks;

Oklahoma has a cross connection control program designed to protect citizens from toxic contamination of potable water supplies by testing plumbers on techniques used to prevent back siphonage of toxic materials from sewers into the water system. Back siphonage from a hotel air conditioning unit is suggested as the cause of Legionnaires disease;

Arkansas has included in its hazardous waste management code a provision for health monitoring and health hazard identification whereby prior to the operation of a new commercial hazardous waste facility, the state may request the apporpriate health agency to perform a community survey to establish baseline health data. Investigation of health conditions among a statistically representative portion of the surrounding population and pertinent epidemiological investigations may be conducted in the future, as deemed appropriate. Establishment of baseline data will provide a norm against which health effects occurring at later dates can be compared to determine if significant changes have taken place that may be linked to emissions of the hazardous waste facility.

Group Y States

States characterized by the following description include: Arizona, Connecticut, Colorado,* Delaware, Iowa, Kansas, Kentucky, Louisiana,* Massachusetts, Minnesota,* Montana, New Hampshire, Pennsylvania,* Rhode Island, South Carolina,* Texas,* Utah, Vermont, Washington and Wyoming.

1. Interagency Management Mechanisms: Use of *formal, permanent committees, commissions or processes* designed to encourage more comprehensive management of dangerous chemicals characterizes most of the Group Y States (14 out of 20). Such efforts vary, but they include the institution of permanent committees, boards, commissions, formal planning processes, or study group systems that usually revolve around a central focus or theme. They emphasize integrating relevant state agency activities and functions that cut across the media-specific, operation-specific and product-specific environmental programs. The central focus tends to be operational, with the most prevalent being hazardous materials incidents. May of these states have interagency, cooperative efforts to control pesticides, as well. Examples of various mechanisms include:

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* States for which additional information may indicate a change in grouping.

In 1979, Louisiana established an Environmental Control Commission by law with the primary function of developing unified state-wide policies on hazardous waste management. The Commission has the power to issue regulations and coordinate environmental management functions among seven major departments which have named representatives to the Commission. These departments cover a wide range of responsibilities for various aspects of dangerous chemicals management (e.g., hazardous waste, hazardous materials, pesticides, air quality, surface and drinking water quality, and emergency response to hazardous materials spills). Although its principal mandate is to coordinate activities among the seven departments as they relate to hazardous waste, the Commission has been involved in effecting some coordination and integration in hazardous materials emergency response operations and air and water quality activities;

Massachusetts has a permanent Secretariat, the Executive Office of Environmental Affairs, charged with apportioning major environmental control responsibilities between two key departments - the Department of Environmental Quality Engineering and Environmental Management. The former engages in regulatory and enforcement activities for hazardous waste, air, surface and drinking water programs and the latter concentrates on policy development initiatives. The Secretariat also acts to coordinate and mesh a miscellaneous collection of environmental programs housed in three other departments - the Departments of Fisheries and Wildlife, Food and Agriculture, and Metropolitan District Commissions (Divisions of Environmental Planning and Environmental Quality);

Utah has a State Advisory Council on Science and Technology consisting of 12 technical members from the state university system and various industries and 8 state agency heads. The Council examines a broad range of technical and scientific issues, many of which include those relating to environmental pollution control. The Council establishes various committees to focus inquiry on specific problems;

Iowa's Central Planning Commission coordinates a formal planning process that involves all relevant sections of the state's Department of Environmental Quality including air, surface and drinking water quality, and hazardous waste areas. Planning sessions are convened to assess and accommodate inter-program impacts and clarify staff responsibilities whenever prospective changes or new initiatives in environmental control are considered;

The Kansas Department of Health and Environment operates an intradepartmental study group system among its air and water quality, hazardous waste and occupational safety and health component divisions. The systems' overall goal concerns comprehensive examination of the community impact of hazardous waste and other private chemical industry activities. Study groups assess problems and make recommendations for action taking into account the affected population and its environment. Publication of a final technical report and the integration of activities often emerge, including the establishment of joint testing procedures, analyses, surveys, or inventories facilitated through cooperative efforts of relevant staff;

The Texas Energy and Natural Resources Council, established in 1979, acts as an independent agency designed to develop broad intergrative policy and effect overall coordinated planning among relevant state agencies working on state energy and environmental concerns. The Council consists of 12 state agency representatives, 4 legislators, 4 citizens, and a governor's advisor. Although the Council has no regulatory, enforcement or monitoring responsibilities, it makes recommendations to the governor and state legislature for improved management. The Council establishes working committees to address specific issues, one of which includes toxic chemical wastes;

In 1978, the Governor of the State of Washington established by executive order the Hazardous Materials Management Committee as an advisory/policy group made up of 15 state agency representatives. The Committee focuses on hazardous materials emergency response and transportation issues and is designed to effect better cooperation and coordination among all agencies having responsibilities in these two areas as well as to provide a focal point for working with local governments;

Wyoming's Governor formed a Hazardous Materials Committee by executive order in 1979 specifically designed to effect better coordination and improved management in the overall area of hazardous substances control. Representatives of six major agencies handling air and water quality, hazardous waste management, transport, and emergency response needs meet regularly to discuss and make recommendations for enhancing cooperation among agencies and program activities that interrelate;

In 1978, the Governor of the State of Vermont established a Hazardous Materials Management Committee consisting of representatives from four major departments (Public Safety, Agriculture, Civil Defense, and Labor and Industries), two major agencies (Environmental Conservation and Transportation), the State Fire Fighters Association, and the State National Guard. Although the initial focus of the Committee involves addressing hazardous materials emergency and transportation issues demanding interagency input, its mandate is expanding to include other areas of inquiry requiring enhanced interagency coordination, cooperation and communication (e.g., hazardous waste and environmental monitoring and sampling equipment needs);

Pennsylvania has an interagency Environmental Quality Board that adopts rules and regulations for the protection of health, safety, welfare, and property including air, water, and other natural resource protection. It also acts to coordinate the administration and enforcement of various environmental laws.

The use of *ad hoc, temporary task forces* also characterizes Group Y States. They are usually interagency bodies established for a short-term duration to focus inquiry on specific issues or crises, rather than broader concerns handled by the permanent committees discussed previously. Often they study management issues such as review of environmental authorities, program or activities to determine gaps, overlaps and inconsistencies and recommend improvements. Some examples include:

Massachusetts has an 18 member Special Legislative Commission on Hazardous Waste to address waste facility siting issues;

Rhode Island has a task force made up of the Departments of Environmental Management and Health and the Water Resources Board, with the Office of State Planning acting as lead agency. The task force is currently working to pull together a comprehensive goundwater management program;

Arizona established the Hazardous Materials Program Review Committee in 1979. The Committee, consisting of several state agencies, has the purpose of studying and recommending legislative changes and organizational improvements in hazardous materials emergency response as well as examining the feasibility of coordinating all state hazardous materials management programs. The Committee works directly under the auspices of the Governor and has already recommended that responsibility for regulating the transport of hazardous materials be shifted from the Arizona Corporation Commission to the Department of Transportation.

Functional integration spanning the various environmental media and hazardous materials operations and products is characteristic of a few of the Group Y S-ates. Such integration efforts include: pulling together all relevant environmental laboratory services under one office; the development or modification of hazardous materials emergency response plans so that they are more comprehensive and cover a wider variety of agency functions for handling of transportation as well as fixed site accidents involving not

In 1978, Connecticut established a Hazardous Materials Spills Environmental Emergency Task Force which analyzed potential hazardous materials problems and recommended organizational changes in the relationships between public health, safety and the environment. The Task Force consisted of representatives of the Departments of Environmental Protection, State Police, Transportation, Motor Vehicles, and the Office of Civil Preparedness, the National Guard, the State Fire Marshall and the Connecticut Chiefs of Police and Fire Chiefs Associations. Based on their final report, the Governor issued an executive order clarifying agency responsibilities for hazardous materials emergency response, calling for the development of a comprehensive management program thereof, and establishing the need for legislation to fill identified gaps in emergency hazardous materials authorities. The Hazardous Materials Management Unit was created within the Department of Environmental Protection with oversight responsibility for pesticides, hazardous waste disposal and transport, and oil and chemical spills for all aspects of state management including planning, regulating, licensing, monitoring, training, enforcement, and coordination;

The Governor of Kentucky established an Asbestos Task Force comprised of representatives from the Departments of Education, Natural Resources and Environmental Protection and Human Resources as well as the Cabinet for Public Protection and Regulation to investigate problems of asbestos in schools;

health related data with which they can perform correlations and examines trends between illness and disease incidence and environmental contamination. They recognize the need for employing environmental epidemiologists and toxicologists, although for the most part there exist no specific, organized programs in environmental epidemiology or toxicology. Major obstacles include lack of staff, time and funds and also to some extent a lack of awareness and support on the part of environmental managers for state health authorities taking an active, participatory role in the day to day management of environmental programs.

In addition to the examples found in the compendium to this report, Group Y activities of interest include Massachusetts' Department of Public Health preparation of health profiles on 351 cities and towns which contain statistical assessments of the incidence of 60 diseases; Utah's monitoring of work-related illness rates; and Washington's studies of the health problems associated with formaldehyde in prefabricated homes, worker exposure to contaminants found in the coal tar, aluminum and wood-working industries, and arsenic exposure of workers in copper smelter plants.

3. Information Gathering: Systematic information gathering efforts of all Group Y States with regard to industrial chemical production and/or use data is limited for the most part to hazardous waste generation and tracking information (volume and type) and/or pesticide manufacturing and use data. In addition, a couple of these states periodically collect other types of chemical use data; for example, Iowa's survey of chemical use in school

just oil spills but all types of hazardous substances resulting in air, water and land contamination; the encouragement of joint environmental inspections; one-stop permitting activities and pre-design conferences for industries.

Among Group Y States, coordination, cooperation and communication on issues not covered by the permanent committees, ad hoc task forces or functional integration activities, occur in an informal way. Informal networking and information-sharing among state agencies primarily occurs as a reaction to an imminent problem or crisis situation for which state program managers perceive a real need to obtain and share information with each other. For example: air and water quality program managers rarely exchange information, except when a particular pollution problem reaches emergency proportions and it is readily apparent that the problem involves both air and water quality issues; the state health authority is rarely consulted by environmental program managers unless the pollution incident reaches emergency proportions and a serious health crisis is imminent. Informal, ad hoc exchange of information with regard to routine concerns appears to be the norm as well as the preferred method as documented by Group Y officials.

2. Health Effects Monitoring & Studies: Several Group Y States have done isolated studies and a few states are doing some ad hoc monitoring. All Y States note the necessity of doing so and are extremely interested in becoming involved in this area. They are collecting more sophisticated environmental quality data through their monitoring programs but have little state-level

government in at least four out of the seven program areas. About half of these states, however, have acquired basic enforcement responsibility for six out of the seven. All of these states have begun or are actively promoting action in toxics control, primarily in their surface and/or drinking water quality programs and in some cases in their air quality programs. Integration of strong interest and action in toxic substances control in the ongoing environmental enforcement programs, however, has been accomplished on an ad hoc basis. For a few states, quite a bit of effort in toxics control seems to be occurring as a result of the EPA/State agreements for 1980. However, it is difficult to say conclusively that the concerns on paper have actually been translated into concrete actions.

Examples of where states are modifying the basic federal programs and integrating toxics-related activities follow.

Connecticut has a statute concerning the use, production, storage and disposal of chemicals as listed in 40 CFR 116 and as designated in Section 311 of the FWPCS, whereby manufacturers must submit to the nearest local health director upon his/her request, a list of such chemicals. The Act includes provisions for the treatment of trade secret information. The state also has a statute on information and notice requirement for employers using listed carcinogens within the workplace and one that lists carcinogens for which producers/users must submit an annual report to the Commissioner of Environmental Protection and Health Services.

science laboratories and Kentucky's investigations of the presence of asbestos in schools.

4. Computerization of Data: Approximately eleven states in this group are in the process of, or seriously considering, computerization of collected data. A few states indicate that they computerize air emissions and water quality data, and several states use federal or private computerized data bases. Those mentioned in this latter category include STORET, OHMTADS, and CHEMTREC. Two of these data bases are specifically designed to assist users to respond more effectively to hazardous materials emergencies. In our discussions with states, we did not talk with computer operations officials or technical experts; rather, we talked to program managers and governor's aides. Computer operations and technical staff may use or be more aware of useful computerized data bases either within the state or those operated by the federal government or private sector. The apparent lack of computerization and/or use of already existing computerized data bases on the part of program managers could be an indication of little state use at all, or perhaps a lack of communication between computer operators and technical staff and environmental program managers.

5. Individual Environmental Programs/Nature of Toxics Control Activities:

Most of the Group Y States exhibit strong, individual environmental programs that for the most part parallel federally-established programs with regard to definitions, standards, and activities. In addition, most of these states have assumed basic enforcement responsibility from the federal resulting from the burning of waste oil. The drinking water program maintains a strong emphasis on extensive testing of exotics and organic chemicals within three communities and with the help of EPA is tracking the sources of such contaminants;

Washington has developed state air emissions standards and monitoring program for fluoride and for total reduced sulfur gases. State laws defines hazardous waste using a two-tiered classification system (i.e., extremely hazardous and dangerous categories, the former being defined as those wastes exhibiting acute or chronic toxicity and the latter being defined as wastes that are physically harmful such as flammable or explosive and those with low toxicity levels. The criteria for establishing the degree of hazard and the need for regulation involves determinations amde on a case by case basis as opposed to designating specific waste streams as hazardous and hence automatically regulating them as they appear on the list.

Wyoming has developed ambient air quality standards and a state permitting and monitoring system for the control of hydrogen sulfide and hydrochloric acid vapors;

Vermont uses the OSHA-developed TLVs to establish a system of prioritizing and regulating air emissions for pollutants not federally regulated. The state has an ambient air quality standard for lead emission, and is conducting intensive monitoring of air contaminants (25% of which are known or suspected

Kansas issues federal and state pesticides export permits, its air program occasionally conducts air analyses of heavy metals in excess of federal standards, and within the NPDES permit program, the state occasionally exceeds federal minimum treatment standards for discharges;

Kentucky carries out required inspections of incinerators (random samples) and performs laboratory analyses to determine if permitted substances are being burned. The state uses TVLs developed by OSHA for worker exposures for establishing ambient air quality standards for non-federally regulated contaminants.

Louisiana Department of Agriculture's pesticide regulations include a requirement that toxic pesticides or those considered highly dangerous to man or domestic animals must be distinctly colored or discolored;

New Hampshire's groundwater program requires that groundwater quality meet the requirements of the federal safe drinking water standards. The state's volume exemption for hazardous waste generators complying with manifest system requirements is set at 100 kg and manifest reporting will be done on a load by load basis.

Rhode Island has no volume exemptions for hazardous waste generators required to meet manifest system reporting requirements, and toxicity criteria for hazardous waste are based on ten times the federal drinking water standards. The state has its own air quality standard for air emission

1. Interagency Management Mechanisms: Nearly all states in this group do not use *formal, permanent committees, commissions or processes.* They rely primarily on formal and informal temporary management mechanisms (i.e., task forces, workshops, committees) established on an ad hoc basis, and on informal information sharing among state program managers as the need arises. Notable exceptions, however, include:

- Alabama's Environmental Health Administration within the Department of Health holds regular bi-weekly meetings of representatives of the various state agencies having responsibilities for hazardous substances management. Meetings cover policy development, monitoring, regulating, standards-setting, enforcement and audit issues as they relate to the media, operations, and products (i.e., air and water quality, hazardous waste, and pesticide concerns);
- since the early 1970s, Nevada has maintained an Environmental Commission as a division of the Department of Conservation and Natural Resources. It consists of the four heads of the Departments of Agriculture, Forestry, Wildlife, and Water Resources, a representative from the State Board of Health, and four public citizens appointed by the Governor. The Commission meets regularly to discuss cross-cutting environmental issues handled on a day to day basis by the representative departments. The Commission is quasi-judicial and has regulatory and enforcement responsibilities.

Most of the Group Z States have established *ad hoc temporary task forces of committees* or use informal work-group processes to address specific environmental issues or management-oriented problems. For example:

In 1979, Florida established an interagency Hazardous Waste Task Force to review state hazardous materials emergency response operations and infuse a multi-media approach in preparedness planning response activities and carcinogens) present in several residential communities as a result of woodstove use;

Delaware plans to use EPA-developed wastewater effluent guidelines on toxics for 21 primary industries and 5 classes of toxic pollutant in issuing NPDES permits for new and renewed discharges. The state is involved in a lake and pond eutrophication program and participates in a regional ozone study. The state extensively collects fish tissues and evaluates them for the presence of heavy metals and organics.

In addition, Pennsylvania, Arizona and Kentucky are considering comprehensive toxics legislation. Arizona's Governor is currently putting together a package of recommendations including suggestions for legislation designed to cover all aspects of toxic substances control and to initiate comprehensive management mechanisms to coordinate and streamline current practices. The goal is to enable the state to have central coordination and control over all aspects of toxics substances control, now dealt with by ten (plus) state agencies.

Group Z States

States included in this grouping include Alabama,* Alaska, American Samoa,* District of Columbia, Florida, Georgia,* Guam,* Hawaii, Idaho, Indiana,* Maine, Mississippi, Missouri,* Nebraska,* Nevada,* New Mexico, Ohio,* Tennessee,* West Virginia,* and the Virgin Islands.*

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*States for which additional information may indicate a change in grouping.

Functional integration activities almost entirely involve one-stop permitting practices. Several Z States are actively working toward implementing consolidated permit procedures and a few others are examining their feasibility. Under its Environmental Procedures Coordination Act, Alaska is instituting a consolidated permit application format and definitions for all related permitting regulations and coordinating these efforts with EPA's master permitting guidelines. Single source permitting in Georgia is accomplished by mandating that the Division of Environmental Protection and the Department of Industry and Trade coordinate the review of permit applications, the issuance of permits, and the follow up monitoring of compliance with permit requirements. Mississippi coordinates permitting practices by having all permits program in an informal way by having all permit applications circulated for review among all relevant environmental program managers.

Approximately half of these Group Z States are preoccupied with writing and/or reworking their hazardous materials emergency response plans. Although some states such as Tennessee, have comprehensive plans in place, others such as Alabama, Alaska, District of Columbia, Florida, Idaho, New Mexico and West Virginia consider this aspect of hazardous substances management a higher priority than others.

Other than the types of interagency coordinative mechanisms described above, all Group Z states depend heavily on *informal, ad hoc information sharing and coordination* when the need is perceived by various program managers.

after-incident evaluations. The ultimate goal is to delineate relative state agency responsibilities for hazardous materials emergency response operations;

Mississippi's Bureau of Environmental Health conducts informal working group meetings designed to examine coordination problems among the surface and drinking water quality, pesticides, hazardous waste, and air quality staff activities of the Department of Health, Agriculture and Commerce, and Natural Resources. Their goal is to identify and address gaps and duplications in the management of environmental activities, especially those related to hazardous waste management;

Tennessee's Governor has initiated an interagency review of hazardous waste management options focusing on legislative needs, handling and dispsoal practices, and inventories of hazardous waste generators;

Idaho has an interagency task force to improve the state's hazardous materials emergency response capabilities and develop a written plan delineating various state agency responsibilities;

Maine has an interagency Groundwater Protection Commission reviewing relevant authorities and problems pertinent to this aspect of water quality and hazardous waste management. The Commission consists of representatives from the Departments of Human Services, Conservation, and Environmental Protection.

4. Computerization of Data: Two of these states indicated that they are currently computerizing hazardous waste generation data and seven states are studying the feasibility of, or are actually in the process of, computerizing manifest system reports, pesticide data, or water quality data, Alaska, however, is studying the feasibility of implementing a state-wide management information system to include all data necessary to characterize the environmental conditions in the state.

One state reported use of CHEMTREC and OHMTADS and three states reported that on occasion they use the TSCA inventory data available through EPA.

5. Individual Environmental Programs/Nature of Toxics Control Activities: Approximately ninety percent (90%) of the Group Z States have assumed basic enforcement responsibility from the federal government in three or four out of the seven key environmental programs. Approximately ten percent (10%) have assumed primary enforcement responsibility for six out of the seven programs. For the most part, these state-run programs adhere directly to federal guidelines. Approximately seven states report some specific activities designed to document and control toxics problems, especially in water quality, while the remainder have toxic-related activities planned for future implementation.

Examples of some of the more interesting of these states follow.

Approximately sixty-three percent (63%) of these states seem to rely almost totally on this method.

2. Health Effects Monitoring and Studies: Sixteen of twenty Group Z States evidence no health effects monitoring/study efforts, although considerable interest exists among the states' health officials. Four states, however, perform isolated studies or monitoring efforts:

- Alaska's Department of Environmental Conservation is studying the potential relationship between the disease giadiasia and chemical contaminants in drinking water. It is suspected that the disease may be caused by the transmission of unfiltered chemical contaminants in surface waters;
- Florida's Department of Health and Human Services and the Department of Environmental Regulation are conducting a joint study of the potential health effects associated with toxic waste sites in the state;
- Mississippi's chemical laboratory has a cooperative agreement with EPA to study the health effects of some chemicals and the Department of Toxicology of the University Medical Center does research in identifying new treatments for human exposure to toxic chemicals;
- Missouri informally monitors the incidence of cancer through its voluntary cancer registry.

3. Information Gathering: Systematic information gathering efforts of all Group Z states with regard to industrial chemical production and/or use data is limited for the most part to hazardous waste generation and tracking information (volume and type) and/or pesticide manufacturing and use data. Mississippi, however, maintains a computerized list of chemical manufacturers located in the state. Missouri has a voluntary cancer registry, and had proposed a law on cancer reporting requirements that was ultimately defeated.

The Department of Toxicology at Mississippi's University Medical Center currently maintains information on all toxic substances made, sold and used in the state along with records of toxic substances, their chemical and physical make-up, effects on humans and recommended treatments for exposure, and provides a 24 hour information service to public citizens and government officials;

Nebraska is currently monitoring groundwater and landfills for toxics and will develop post-emergency lab support capability and timely access to toxicological and medical data;

New Mexico has a groundwater monitoring program which emphasizes toxics identification and is in the process of rewriting regulations to require all those discharging toxics into groundwater prepare detailed plans specifying type, quantity and concentration of the toxic discharges. The state pesticide program regularly exchanges technical information with the State Poison Control Center;

West Virginia is currently monitoring for toxics in drinking water. The state would like to expand interagency coordination beyond emergency situations and begin to unify approaches to toxic substances control. Also it will be developing a plan to evaluate acid mine drainage problems through sampling and analysis as a first step toward designing an acid rain management program;

Alaska is currently conducting an ambient air lead study and organic and inorganic chemical analyses of drinking water samples. The state's five year plan places increasing emphasis on monitoring and testing for toxics in the water quality programs, and doing more laboratory analyses of organic, inorganic, trace elements, turbidites, and bio sampling for specific toxics found, and linking them the NPDES permitting practices;

The District of Columbia will be developing a plan to deal with toxic chemical wastes of hospitals and laboratories, establishing an air quality monitoring network for measuring lead concentrations, and assessing the degree of toxics problems in the area;

Georgia will sample state waters for toxic substances and initiate control through NPDES permitting program. The state will also initiate volatile organic chemical regulations for the air program;

Idaho will be examining toxic disposal of waste and toxics chemical storage problems in a selected county and will develop a state-wide program on the disposal, storage and use of toxics containers;

Indiana is looking for ways to enhance inter-program cooperation for using data collected on toxic substances;

Maine has developed regulations on air emissions of sulfur compounds, and will develop an acid rain monitoring and analysis program. The state is currently studying and documenting ozone violations;

task forces, although toxics issues probably arise within task forces on emergency management, hazardous waste, groundwater, and so forth.

On the whole, X States integrate toxics activities through the establishment of clearinghouses, central repositories of information, formal information sharing tools such as hazard alerts, memoranda of understanding and joint permitting practices more than other states. Although Y and Z States do integrate like environmental management functions to some extent, their efforts primarily center in response planning,delineating appropriate state agency roles for crisis situations, one-stop permitting and some consolidation of laboratory services. Y, and especially Z, States rely heavily on informal networking and information exchanges, and most informal information sharing takes place under emergency conditions. Approximately 90% of the Group Z States rely almost completely on ad hoc interagency coordination through temporary task forces or informal channels for day to day concerns.

State organizational arrangements have evolved as a result of: a specific emergency situation or threat for which a temporary task force is established to coordinate agencies' response to pollution accidents (e.g., spills or pervasive PCB contamination of animal feeds) or a series of mismanaged pollution crises pinpointing the need for permanent coordinating mechanisms.

Group X States recognize a need to establish formal mechanisms and a systematic approach toward environmental management that encourages regular exchanges of information. Having experienced severe toxics crises, (e.g.,

Intergroup Contrasts

Contrasts between the three groups across the five descriptions provide an understanding of how their needs differ.

Intergroup Coordination, Communication & Cooperation: In general, all X States encourage interagency coordination, cooperation and communication through the institutionalization of a toxics integration strategy. This strategy is implemented by a relatively centralized coordinating mechanism with specfically designed management tools. About 75% of Group Y States use various forms of permanent interagency coordinating mechanisms to integrate like environmental activities. These, however, are organized around the focal points of hazardous materials emergency response, transportation operations or hazardous waste management rather than toxics. Few of the Group Z States use permanent interagency committees, commissions or boards to integrate broad environmental management concerns. Rather, Z States use temporary interagency task forces to develop policy and recommend activities for handling very specific issues (e.g., hazardous waste siting as opposed to overall hazardous waste management).

On the whole, Y and Z states use more ad hoc task forces than X states which for the most part, rely on subcommittees for studying specific issues. Neither Y nor Z States reported any specific toxics control ad hoc groups or to be asked; However, the key difference is that X States ask both, while Y and Z States seem only to ask the latter. While most Y States and a few Z States show a concerted effort toward ensuring more integrated environmental management, the tendency remains somewhat reactive and piecemeal rather than proactive and comprehensive. The kind of issues they determine as necessitating interagency coordination, the issues that may be overlooked in the process, the membership of the interagency bodies (few have a public, occupational or environmental health member), and the apparent lack of activity in the area of long-term health hazard implications all point to this conclusion. This seems to be even more true of Z States.

Officials of Y and Z States have mixed feelings about the effectiveness of formal interagency mechanisms to enhance coordination, cooperation and communication. Some feel they increase turf problems and slow down pollution control progress by creating another layer of bureaucracy with more paperwork and red tape. Others feel they decrease turf problems, provide a mechanism for increased awareness of what others are doing in similar areas, enhance the possibilities of exchanging notes on respective staff experiences/expertise that may help others with similar problems, and in the long run may help to achieve more comprehensive management of hazardous materials. Most states agree, however, that regardless of the disadvantages, interagency coordinating mechanisms do increase awareness of the activities of their counterparts and as such provide a forum for greater information sharing especially among those state agencies that rarely communicate on a regular basis.

Love Canal in New York and kepone contamination in Maryland and Virginia), having accumulated alarming environmental quality data and observed disturbing trends in disease incidence, these states have integrated environmental management around a toxics focus and are actively striving to be proactive and comprehensive in their management schemes. Reduction of the quantity and type of pollutants entering the environment and long-term protection of human health through their various program activities highlight their proactive orientations.

Many of the permanent organizational arrangements of the Y States and task forcing of the Z States demonstrate that their concerns rest in the emergency management, transport and hazardous waste areas. In emergency management, long-range prevention or reduction of damages activities center in mitigating a spill or other hazardous materials accidents. Mitigating the immediate and longer-range health effects that may be associated with a chlorine leak, for example, is apparently not as much of a concern as it is with the X States. Hazardous waste issues tend to be viewed in terms of cleaning up abandoned sites and tracking waste through the manifest system to be sure that undesirable dumping does not continue to plague the future. Y and Z States do not seem to be initiating strong action to reduce the amount or type of toxic wastes or to be addressing the health implications related to hazardous waste sites. Whether pollutants should or should not be entering the environment because of their potential long-range health implications is not of key importance. Rather, effort is focused on what level is tolerable as prescribed by the federal government. Both questions need may result during or after a discrete hazardous materials incident in addition to the traditional emergency medical concerns. The concept of emergency also does not include the element of crisis mitigation through the reduction of the number and type of pollutants entering the environment on a day to day basis. If formal interagency mechanisms are primarily designed to handle crises or a limited number of concerns, if the view of environmental emergencies remains narrow, and if most organized information sharing takes place on an ad hoc basis, or organized basis only for crises, states should question whether they are perhaps overlooking vital environmental management elements and whether a more comprehensive strategy should be devised. Serious consideration of these potential deficiences is warranted in Y and Z States; also, X States should evaluate the extent to which their proactive orientation and "comprehensiveness" are implemented at the operational level.

Health Effects Monitoring & Studies: Group X States are much more sophisticated than others in health effects monitoring and studies. They are doing significant work in environmental epidemiology and toxicology, and are systematically collecting or establishing tools to collect illness and disease incidence data (e.g., cancer registries, worker exposure/illness data or information on the extent of hospitalization due to toxic exposures). Several Group Y States have undertaken significant, but ad hoc, health effects studies and a few have attempted to collect disease or illness data. Most Group Y State health officials are intensely interested in this field. Z

In addition, about 25% of the Z States specifically mentioned the need for more formal management strategies designed to effect coordination of environmental policies and their implementation.

All things considered, ad hoc networking remains the predominant method for fostering coordination and communication among Y and particuarly Z States for most environmental issues. We surmise that such an approach results in serious gaps in the state's ability to coordinate, communicate and cooperate sufficiently to foster comprehensive environmental management that prevents problems. Fostering effective ad hoc, informal communication depends on the program manager's awareness of who is doing what in the state bureaucracy, the existence or non-existence of turf problems, the amount of time available to share knowledge, and the perception of the importance of information sharing on a day to day basis.

In addition, hazardous materials emergency response is the predominant area in which Y and Z States formally and informally cooperate and exchange information. Emergency situations are by no means the only arena where coordination, cooperation and communication must occur for effective management. A pollution incident is not really perceived as an emergency until it reaches the proportions of a Love Canal or an accident such as a chlorine tank spill producing an instantaneous explosion. For most states, the concept of a hazardous material emergency does not include the concern for potential long-term health implications and the effects of degradation of the environment. Nor does it include concern for acute health effects that may result during or after a discrete hazardous materials incident in addition to the traditional emergency medical concerns. The concept of emergency also does not include the element of crisis mitigation through the reduction of the number and type of pollutants entering the environment on a day to day basis. If formal interagency mechanisms are primarily designed to handle crises or a limited number of concerns, if the view of environmental emergencies remains narrow, and if most organized information sharing takes place on an ad hoc basis, or organized basis only for crises, states should question whether they are perhaps overlooking vital environmental management elements and whether a more comprehensive strategy should be devised. Serious consideration of these potential deficiences is warranted in Y and Z States; also, X States should evaluate the extent to which their proactive orientation and "comprehensiveness" are implemented at the operational level.

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States, as a whole, have done very little in this area, although four states documented specific ad hoc efforts.

Y and Z states find their toxics activities somewhat hampered by relative lack of health effects study and monitoring. Those states that are making concerted attempts are much closer to being able to document, analyze and ultimately control toxic contamination effectively. Systematic collection of health data remains a vital component for toxics control as evidenced by X State activities. This usually requires laws mandating worker illness, physician documentation and disease incidence reporting to the state. Information gathering requirements that sufficiently protect the privacy of industry and the public but are more specific than traditional emergency health authorities are needed, yet they are apparently lacking in most of the Y and Z States. Efforts need encouragement where they do not exist, and technical and financial assistance to further work already begun.

Information Gathering: Systematic collection of sophisticated production and use data on a prioritized number of chemicals, or plans to do so, characterize X States. Group Y and Z State efforts are primarily centered around collecting hazardous waste generation and/or pesticide production and use information.

The extent to which production and use data is collected on chemicals other than pesticides, and substances other than waste, is an important aspect of proactive toxics management. Those states that are predominantly chemical users, as opposed to producers, will have different problems. Their concerns may rest primarily with worker exposures to chemical processing in the industrial complex. In many ways, the ability of a state to regulate chemical use properly and protect its workers will depend not only on its perceived need to do so, but also on the proper labelling of chemicals produced in another state and the knowledge it has of what is being used in the state. The extent to which proper labelling is not provided and the extent to which the state using or producing chemicals does not know what is being used or produced in its industrial complexes hampers the state's ability to protect public and worker health.

Understanding the properties of chemicals used or produced in a state (concern over chemicals at the beginning of the life cycle as opposed to simply at the end of it, i.e., waste) and not just limiting such knowledge to pesticides could assist states in their public protection roles. Without adequate information to characterize vulnerabilities, control strategies become irrelevant.

Computerization of Data: Three quarters of Group X States have computerized, or are planning to computerize, data of one kind or another (e.g., waste manifest, water and air quality, pesticide, health effects, and chemical inventory data). In addition, six states have developed, or are planning to develop, elaborate computerized management information systems for integrating diverse kinds of environmental and health related information obtained by the state and available from other data sources. Many of the X States extensively use, or are planning to use, federal and private computerized data bases such as CHEMTREC, OHMTADS, CHEMLINE, MEDLINE, TOXLINE, STORET, SARAOD, CANCERLINE, UPGRADE. About half of the Group Y States are computerizing some data, mostly on an ad hoc basis, with few states' using federal or private computerized data bases. Those mentioned, however, were CHEMTREC, OHMTADS and STORET. No comprehensive management information systems were reported as in operation or planned among the Group Y States. Nearly half of the Group Z States are computerizing some data or are planning to do so, however, most are in the planning stages. Few Z States make use of federal or private data bases.

Very few states across all three groups mentioned the use of the TSCA inventory data. States' comments as to why they do not do so include: usually the data that the state needs is confidential; slow turn-around time when requesting TSCA information from EPA, and the state usually needs to know as soon as possible; and the TSCA inventory is of little help when trying to determine the possible effects of a chemical mixture as data concerns pure substances. Complaints about the usability of the TSCA inventory data usually were made by X States, while few Y or Z States have used the data and hence had no comments. The drawbacks to the use of TSCA inventory data have prompted X States to do their own chemical inventories.

The relative lack of computerization of data and the use of outside data bases can hamper states' trying to manage diverse kinds of data. Computerization would allow for more rapid and efficient use of the data collected.

Management information systems, especially those that are interactive and for which data can be entered systematically, would enhance states' ability to observe trends and make correlations. The correlation of various kinds of data is necessary if states are going to document health effects so that appropriate control actions can be initiated.

The relative lack of computerization, and especially the use of existing federal data bases by program managers, could reflect three problems: non-state use in general; the lack of communication between computer and technical specialists and environmental managers; i.e., between those who actually use these systems and those who could make use of the information for decision-making purposes, or lack of sufficient knowledge about existing data bases at state and federal levels and/or federal and state communication gaps. Environmental managers need to become more aware of the benefits of computerizing state data and using federal and other private data bases. Funding is a basic obstacle; however, if states could see the costs and benefits they might spend scarce funds in this area. In addition, the on-line and subscription costs of federal data bases may be prohibitive and centralized servicing of information requests should be explored.

Individual Environmental or Toxics Programs: Eighty three percent (83%) of Group X States possess strong individual programs in six of the seven environmental program areas reviewed. The other states have assumed basic enforcement responsibility from the federal government for five out of the seven. Through toxics integration strategies, Group X States are systematically incorporating toxics control activities into environmental management. Fifty percent (50%) of Group Y States have strong individual programs in 6 out of the 7 areas and the remainder, 4 out of 7. These states as a whole have not, however, systematically infused toxics control action into overall environmental management as X states have, but do engage in some interesting toxics control efforts on an ad hoc basis (usually within the water program areas). Ten percent (10%) of the Group Z States have assumed basic enforcement responsibility for 6 out of 7, the remainder have done so for 3/4 of the the 7. These states place relatively little emphasis on specific toxics control activities within individual environmental management programs, although concern for toxic problems exists. Much of their effort is apparently going into assuming basic inforcement responsibilities.

It appears that having strong individual programs may be a necessary first step prior to assuming the task of creating overall management strategies to coordinate programs and incorporate a toxics emphasis as appropriate. States working on establishing a viable water quality program or passing a hazardous waste management act in order to be able to assume federal responsibility may not have the time or the resources to spend in looking at the whole picture. To the extent they can be encouraged to look at the management aspects while implementing individual program pieces they should be. Suggestions obtained through information sharing with other states may be helpful in raising toxics integration management issues.

In addition, states beginning to implement environmental quality monitoring programs, upgrade and expand laboratory and enforcement staff capabilities are at the stage of assessing their vulnerabilities. Obviously this is a necessary step prior to being able to initiate control strategies. Characterizing a state's environmental quality with respect to toxics is, additionally, more complex and requires strong support capabilities to be firmly in place in order to assess the state's toxic vulnerability in particular. Those states that are well along the way toward implementing strong programs will be more ready and able to look toward better management tactics for comprehensively handling problems in a more coordinated way. More resources can then be freed up to concentrate on specific, complex toxics problems identified by the various individual programs. Also, resources could be freed up to concentrate more on human health implications inherent in toxics control rather than simply concentrating on the environmental degradation and enforcement of the federal pollutant criteria standards. Given a more favorable climate, creativity in management strategies might then ensue.

TOXICS ACTIVITIES WHICH "X" STRATEGY STATES APPEAR TO EMPHASIZE
(Omission of certain activities does not mean they do not exist in the state. These are emphases.)

		AR	CA	IL	MD	MI	NJ	NY	NC	OK	PR	A	
ORGANIZATION	State Agency Toxics Office			X	X	X	X	X	X	X	X	X	X
	Interagency Committee/Task Force	X	X	X	X	X			X	X		X	
	Governor's Office Lead	X	X		X				X			X	
	Public/Industry on Committee/Task Force			X	X	X				X		X	
LEGAL AUTHORITY	Executive Order	X	X				X	X	X				
	Law			X	X	X				X	X	X	
	Regulatory Authority			X	X			X		X			
	Planning Authority	X	X	X	X	X	X	X	X	X	X	X	X
	Advisory	X	X	X		X			X			X	
	Evaluation of Existing Toxics Regs/Laws	X		X	D					X	P	X	D
	Assessment of Economic Impact	D		X				D			P		
MECHANISMS FOR INTEGRATION	Formal Interagency Agreements				D					X			D
	Use of Existing Administrative Structures	X	X		X	X	X	X	X	X	X	X	X
	Resource Sharing	P	D	P	X			X		X			D
	Information Networking Among Agencies/Programs	P	D	D						X	P		
	Consolidated Permit Process	P			D	D	D						
	Involvement of Educational Institutions			X	X	X			X	X			X
INFORMATION GATHERING AND PROCESSING	Inventories of Chemical Production/Use Data	P			X	X		X	D			X	
	Industry Information Disclosure Requirements									X		X	
	Chemical Hazard/Priority Assessment	D		D	D	X	X	D	P		P	X	
	Toxics Sampling/Testing	D		P		X	X	X					X
	Chemical Data Registry/Resource Center	P	X		D	X	X			D			
	Computerized Chemical Information Data System	P			D	D	D	D	P			D	P
	Agency/Committee Annual Reporting Requirement									X		X	
	Agency Management Inventory/ Directory			P								X	
OTHER TOXICS STATE ACTIVITIES	Health Effects Studies/Monitoring			X	X	X	X	X		X	X		X
	Development of Scientific Testing Procedures			D			X	X		X			D
	Development of Chemical Use Standards				X				P			X	
	Investigations			X	X	X		X		X		X	X
	Penalties/Enforcement Focus		X	X			X					X	
	Chemicals Crisis Planning	D			D	X	X				P	X	D
	Training						X			X			
	Local Involvement			P	X			X			P	X	
	State-Industry Chemical Information Exchanges			P	X	X					P		
	State-Federal Activity Coordination	D			X		X	X		X	P	X	X
	Public Information/Participation									P	P	D	
PRIORITIES & OBJECTIVES	Reduction of Toxics Use/Exposure	X	X				X		X		X	X	X
	Elimination of Administrative Gaps/Overlaps	X	X			X		X		X	X	X	
	Intensify Health Effects Studies/Monitoring			X	X		X						X
	Expand Information Gathering Activities			X	X	X		X	X			X	

V. SUMMARY OF STATE DANGEROUS CHEMICALS MANAGEMENT PRACTICES

This compendium summarizes specific state chemical management practices and activities which promote the concept of integration among all environmental media, operations and management functions. It is divided into three broad parts on strategies, legislation and specific innovative or noteworthy programs.

We have chosen to summarize management strategies, legislation and innovative programs with a sampling of state activities, rather than "laundry list" piecemeal descriptions of every state and territory. This reflects the fact that the vast majority of states do not function under an integrated toxics control strategy synthesizing all toxics-related programs and activities, but many have specific programs worthy of inclusion in an integrated state strategy.

The twelve states found to operate under an integrated toxics strategy are documented. It should be noted that this summary does not profess to include all innovative toxics-related state programs, but merely is as thorough a sampling as could be compiled from the interviews and materials provided by state officials. All fifty states and territories were contacted and materials on each were received, developed, compiled and analyzed, with the exception of Oregon, North and South Dakota, and the Northern Mariana Islands which were not completed due to time constraints.

Examples included were chosen to provide useful information for governors, their aides, state officials and other managers responsible for controlling the adverse impacts of chemicals in the environment. It is recognized, however, that some programs may have undergone changes, or may be even further developed than indicated at the time the data were obtained in the fall of 1980.

It is, of course, impossible to include all the organizational, administrative, legislative and funding details one might wish to read here about individual programs. For this reason, two key contacts (the designated governor's aide and state agency official) for each described state strategy or program appear at the end of each description. Also, a full list of contacts reached in all states and territories appears in Section V. They may be contacted by any reader who would like to obtain more detailed information about any state toxic management programs or activities.

State Toxics Integration Management Strategies

This part of the report examines tweleve state integrated toxics management strategies. It includes factors such as the impetus for the strategy, legislative authority, date and extent of reorganization or institution, objectives and current implementing activities.

ARKANSAS

Arkansas' strategy for integrating toxics substances management was initiated from recommendations of a state Toxics Substances and Hazardous Materials Policy Committee. This Committee was established by Executive Order 78-2 in 1978 for the purpose of conducting an in depth study of the nature of the toxic substances and hazardous materials problems in Arkansas, their cause(s) and their potential solutions. It is comprised of representatives from the state departments of Labor, Office of Emergency Services and Governor's Office.

On December 22, 1978, the Committee forwarded a report to the governor entitled, "On the Arkansas Strategy for Toxic Substances and Hazardous Materials." It recommended a state toxics control strategy involving a "workable, highly visible framework for decision-making, prevention and control within all affected levels and branches of government."

In preparing the study, the committee conducted numerous public hearings and interagency meetings, as well as a survey and analysis of all relevant state and federal programs with authority or application over the manufacture, transportation, use and disposal of toxic substances.

The report addresses the following toxics management problems in Arkansas:

1) continued pressure for economic and technical growth;
2) a depleting resource base;
3) lags in and misdirections of earlier government (state and federal) programs;
4) inadequate knowledge of chemical effects (environmental and health);
5) lags between the creation of chemical-related problems and their wide-spread recognition;
6) inadequate systems to properly manage pertinent information (e.g., interactive data system); and
7) institutional arrangements which result in economic, technical and environmental decisions to be made without due consideration for the total impact of such decisions.

The state decided to institute a strategy through which diverse activities and participating agencies could be coordinated, with their efforts targeted toward specific areas of responsibility consistent with existing resources and statutory authorities. Accordingly, a four-tiered organization involving the governor's office, the Committee, working committees established under the Committee, and participating state agencies was established, rather than a new centralized state management authority.

Arkansas' Toxic Substances and Hazardous Materials Committee focuses on coordinating and organizing *all* dangerous chemical management activities across state agency lines, across various environmental media, operations, products and government management functions. Thus, the Committee's scope is wider than most of the existing hazardous materials committees in other states. For example, the Committee established a Prevention and Control Subcommittee responsible for a consolidated permit program which is one of the few attempts we found to review industry permits strictly in connection with toxic substances.

The Arkansas plan also initiates toxic substances management in the executive branch, and utilizes existing state mechanisms rather than increasing state regulatory agencies or programs. Although the strategy is in the early development stages, with subcommittees being established and information gathering activities still needed in order to design specific programs, it is evident that Arkansas' approach incorporates its perceived needs and existing resources, with attainable state goals.

Prescribed activities of the strategy are clustered into five principal management areas:

1) intergovernmental cooperation and coordination
2) information management
3) hazard assessment
4) hazard prevention/control
5) crisis response

The Committee, working with the governor's office, is primarily responsible for intergovernmental cooperation and coordination. To do this they:

1) gather and disseminate information
2) solicit public comment

3) establish cross agency reporting methods
4) improve coordination between state and federal programs
5) examine state agency budgets for the most efficient means of implementing the strategy
6) encourage a multi-agency approach to problem solving
7) promote interagency pools of specialized equipment and supplies
8) review laws, regulations and programs concerning radioactive materials

A Subcommittee on Information Management will examine the use of common computerized data bases and recommend a shared management information system. Various duties and responsibilities are assigned to the agencies working on this particular subcommittee. Several interesting aspects of information management will be addressed by the subcommittee:

1) assuring the integrity of data and information;
2) use of existing data bases such as CHEMTREC, OHMTADS, etc.;
3) examination of industrial use and potential toxic chemicals exposures, especially in regard to plant conditions; and
4) inclusion of existing priority lists, alert notices for potential problems, and institution of a central computer file for such lists and notices.

The Subcommittee on Assessment will design a program to monitor the effects of dangerous materials on the worker, environment, food and public water supplies. This program will include trend analysis, epidemiological studies and monitoring of water, soil, food, human tissue, aquatic life and the workplace, and mechanisms to retrieve reports on toxcity, unusual exposures, and relevant health information registries. The subcommittee is also charged with the development of *agency reporting and assessment procedures* to elicit information from which the subcommittee can develop recommendations. The subcommittee will also examine *trend data* on state economic dependence on hazardous substances, and identify the economic and institutional factors affecting the development of alternatives.

The *Prevention and Control Subcommittee* will develop alternative ways to *reduce the use* of toxics and hazardous materials. *Rather than create any centralized regulatory programs*, the goal is to *extend existing regulatory authorities* and activities to accommodate local needs and incorporate opportunities available under federal programs. This requires examining existing regulatory and preventative programs to identify gaps, overlaps and inconsistencies, promote public awareness of the regulations, and provide for modified or consolidated regulatory programs were appropriate. The subcommittee will consider modifying permit procedures required under the state air, water, land reclamation and solid waste acts in order to *integrate state and federal permit programs*. Committee tasks may include:

1) consideration of *total environmental and health impacts* of any facility;
2) solicitation of public comment prior to permit issuance;
3) formalizing procedures for gathering *toxicological information from industry*;
4) promoting a regular *flow of chemical-related data* from the permit process to state data base; and
5) requiring that *spill prevention and contingency planning* be a *permit requirement*.

A Crisis Response Subcommittee is responsible for coordinating transportation-related chemical emergency response through various agencies. Training of local emergency medical personnel is identified as an important element of crisis response and will be a subcommittee concern. Additional tasks include:

1) identification of high density risk areas;
2) payment of claims to widows and dependent children of personnel killed while on duty;
3) establishment of a contingency fund for protection, analytic and communications equipment; and
4) consideration of emergency services office's need for authority to coordinate resources in crisis situations

At a time when an increase in regulatory agencies and activities is viewed as unnecessary and wasteful, Arkansas' approach to managing chemicals on an integrated basis using existing resources may be of interest to other states.

Governor's Office Contact

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Office of the Governor
State Capitol
Little Rock, Arkansas 72201
(501) 371-8040

Agency Contact

Dr. Phyllis Garnett
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Hazardous Waste Management
State Capitol - Room 9
Little Rock, Arkansas 72201
(501) 371-2667

CALIFORNIA

In an effort to achieve maximum coordination and communication among various state agencies and their toxics control activities, a California Toxic Substances Coordinating Council was established by executive order in February of 1980. The Council functions primarily to coordinate and to eliminate duplication and gaps in state toxics management activities.

Heads or deputies of the following agencies sit on the Council:

1) Department of Industrial Relations (occupational health and safety)
2) Air Resources Board
3) Water Resources Board
4) Department of Health Services (drinking water and hazardous waste)
5) Department of Food and Agriculture (pesticides)
6) Department of Human Resources
7) Department of Business and Transportation (hazardous materials transport and spill cleanup)

The governor's representative serves as the unofficial chairperson or coordinator of the Council.

Public concern and media coverage of growing and complex problems associated with toxic chemicals, in concert with the executive branch's involvement with the Federal Inter-Regulatory Liaison Group (IRLG) led to creation of the state strategy and council. Under an executive order, the Council is authorized to coordinate state toxics management activities either through policy integration or coordinating interagency actions such as joint hearings, inspections, monitoring and laboratory analyses.

The Council is developing a state policy for managing carcinogens within all environmental media (air, land, water, workplace). The Council will have no regulatory authority over the policy, but it will encourage integrated regulation development by the separate agencies on the Council. California currently has a carcinogens act which relates solely to the occupational environment, requiring carcinogen users to report exposure and commerce-related information to the Department of Industrial Relations. The Council's carcinogenics policy would substantially expand the scope of the present carcinogens act by covering all media, operations and management functions associated with carcinogenic substances.

The State toxics strategy emphasizes information exchange, penalties for violations of toxics-related regulations and, wherever possible, incentives for industry compliance, rather than focusing solely on the development of more extensive regulations. The forthcoming carcinogens policy mirrors this approach, with no intent by the Council to develop carcinogens regulations. It is projected, however, that the separate agencies will ultimately develop requirements for controlling and reporting information on carcinogenic substances thus providing a comprehensive, integrated carcinogens policy for the entire state.

Through the Council's work on integrating toxics management activities, concensus on the following priorities have evolved:

1) reduction of the overall use of toxic substances;
2) recycling and other waste reduction activities;

3) cleanup and reduction of health and environmental damage due to chemical exposure.

Governor's Office Contact	Agency Contact
Mr. Peter Weiner Special Assistant to the Governor for Toxic Substances Control Office of the Governor Sacramento, California (916) 322-7691	(Same as the Governor's Office)

ILLINOIS

Illinois' strategy coordinates Department of Public Health and Illinois Environmental Protection Agency activities, and also includes activities of the state Pollution Control Board, the Illinois Institute of Natural Resources and the state medical and educational community. In addition, the state has incorporated "umbrella" definitions and coordination powers into the Illinois Environmental Protection Act of 1970 as amended. This is further described in the next part of this report.

The Department of Public Health, one of the two major agencies implementing the state toxics strategy, has operated an informal incident response program since 1972, and it was formalized in 1978. The Office of Health Regulation in the Department's Division of Environmental Health and Sanitation administers the Environmental Toxicology Program, the broad objective of which is to collect and analyze information in order to determine the relative contribution of environmental factors to disease incidence. To the extent possible, the program is also responsible for recommending environmental control activities designed to reduce the occurrence of such diseases.

The Environmental Toxicology Program staff conducts investigative, surveillance, analytical and educational activities and obtains information on:

1) human health effects of toxic chemicals;
2) interaction of multiple chemical agents;
3) scientific bases for criteria and standards development for chemical-related evaluations; and
4) risk/benefit analysis for evaluating the economic impact of recommended control methods.

The main goal of the program involves developing an effective communications network among state and federal agencies, health professionals, physicians and universities as necessary. The state also hopes to increase the probability of receiving early warning of potential hazards through the communication network. The formation of an intra-departmental environmental health task force constituted the first step in implementing this goal. The task force is responsible for establishing clear lines of communication between the Department of Public Health's environmental health, laboratory, epidemiology and biostatistical experts, as well as relevant federal agencies, and other state and local health officials.

To date, this communications network has investigated and fostered interagency communication only on a problem-specific basis. The Department of Public Health has proposed the following additional activities:

1) identifying potentially cooperative agencies, institutions, groups and individuals and listing a primary contact for each;
2) compiling a guide identifying applicable programs including research, laboratory, data management and investigation capabilities of those listed in number (1) above; and
3) developing a workshop for participating network personnel to describe the objectives and workings of the network.

The type of information sharing the state wants to encourage through this network primarily involves:

1) human or animal illness or death caused by exposure to a toxic substance;
2) unusual illness or death in which toxic substances are suspected but not confirmed as contributing factors;

3) results of investigations of toxic substances incidents;

4) routine and special reports of environmental monitoring in the state; and

5) results of research that may be of use in future investigations.

Emphasis will be on extensive coverage through local agencies and individuals who contact the public, and the information will be compiled and periodically analyzed for state and national trends and comparisons, in order to identify emerging hazards.

A second major program goal is to expand the existing surveillance program to investigate acute exposure and more long term health effects studies. Some of the completed research includes:

1) a study of approximately 360 households where the chemical Lindane had been used for over twenty years, conducted in cooperation with EPA and the University of Iowa;
2) a community assessment in central Illinois to identify health effects resulting from exposure to selected chemicals, especially exposure to an organic phosphate compound during a major fire in northern Illinois; and
3) studies identifying numerous pesticides and related products as well as PCBs in state waters, finding that fish in some areas often fail to meet FDA requirements for mercury, PCBs, and other residues.

The state recognizes that, unlike more traditional public health programs, the methodology for studying effects of environmental chemical exposure has not been fully developed. Investigative techniques, laboratory procedures and environmental epidemiology methods must be developed through the experience of public health officials in responding to actual chemical exposure incidents.

At the present time, field investigation is a major emphasis of the state Environmental Toxicology Program, with central and regional office staff combining their expertise to design and execute investigations of toxic exposure. However, insufficient field staff, a growing case load and a lack of adequate technical procedures for identifying the source(s) of exposure, present severe limitations.

Criteria to identify cases of toxic exposure is the highest investigation priority of the surveillance and field investigation staff. The information needed for review in making such a determination includes:

1) the toxic substances involved;
2) available analytical methods for detecting toxic substances in humans and the environment; and
3) whether the impact may be to an individual or have potential broad public health impacts.

Questionnaires and samplings of appropriate media (air, water, food, soil, human and animal tissue) will be issued, and investigative teams including a physician, biostatistician, monitoring expert, laboratory staff member, epidemiologist and an environmental health professional will be organized. Laboratory analysis will be done at the Department of Public Health's Toxicology Laboratory in Chicago. This lab has a great deal of experience in forensic science and has access to the University of Chicago School of Public Health's environmental laboratory facility.

The Illinois Environmental Protection Agency (IEPA) has primary responsibility for protecting the public from toxic and carcinogenic environmental pollutants through regulation. The IEPA operates extensive air and water monitoring programs, including monitoring for non-federally designated contaminants, organic chemicals, pesticides and other toxic contaminants. One study involving trace organics contained in industrial effluents, has resulted in the development of new sampling methodology and equipment specially designed to reduce sampling collection errors.

The IEPA, with USEPA Region V assistance, has also identified and prioritized the major chemical industries that discharge pollutants into state waters. For over two years, selective facilities have been systematically sampled, with many carcinogens identified in discharges. Work is presently underway to characterize the composition of municipal facility discharges subject to pretreatment standards, using a method of simultaneously testing for toxic compounds known as the Ames in vitro test.

The IEPA is setting up a network of biologic monitoring stations to provide biological (pathologic, bioaccumulation and mutagenic) data which could possibly be used to establish a state water monitoring program for toxic and mutagenic compounds.

Beyond the activities of these two agencies, the Illinois Pollution Control Board exercises quasi-legislative and judicial authority over state environmental concerns, conducting hearings on violations of environmental standards and regulations, reviewing petitions for variances and reviewing denial of permit decisions, in addition to reviewing and adopting environmental regulations. The Board, established by the Illinois Environmental Protection Act of 1970, is an independent body comprised of five technical experts appointed by the governor for three-year terms, with no more than three being of the same political party at any time.

The Illinois Institute of Natural Resources, established in the 1978 amendments to the Illinois Environmental Protection Act, is primarily involved in conducting studies to measure present resources, predict future needs and determine economic impact of proposed pollution control regulations. The Institute proposes regulations for environmental protection, generates data for the decision-making process and promotes and coordinates environmental education programs in the state.

A favorable combination of factors including the availability of personnel, similarity of purpose of the two major state agencies involved in toxics control, the new state-supported effort to control toxics, and the availability of expertise from the medical community and teaching institutions, have made it possible to initiate a comprehensive, multi-agency program in environmental health at this time. Through its association with the University of Illinois School of Public Health, the Department of Public Health has established working relationships with other regulatory agencies and the research community. A potential communications network among local health departments, physicians, veternarians, poison centers and other institutions also exists throughout the state. With federal assistance through a TSCA Section 28 grant to the Department of Public Health for developing this communications network among all these elements, the Illinois strategy for integrated toxics management is becoming institutionalized and beginning to encompass more of the specific elements involved in managing dangerous chemicals.

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MARYLAND

Maryland's strategy for integrated toxics management includes a Governor's Council on Toxic Substances and the Department of Health and Mental Hygiene's Environmental Health Administration (EHA), supported by state legislation covering information reporting of health impacts of toxic substances, cancer and occupational diseases. The Maryland Department of Health and Mental Hygiene has primary responsiblity for toxic substances control in the state, with most federal and state environmental programs under the department's Environmental Health Administration. Overall coordination is provided by the Governor's Council on Toxic Substances.

Established in March 1978 by the Secretary of Health and Mental Hygiene with the governor's approval, and by legislation in 1979, the Council is modeled to some extent on Maryland's successful Kepone Task Force. Some of the work begun by the Kepone Task Force is being continued by the Council.

The Council is comprised of experts from the public and private sectors as well as representatives from agencies with regulatory authority for controlling toxic substances. Its membership is drawn from: University of Maryland, Johns-Hopkins University, AFL-CIO, Chamber of Commerce, one member each from the Senate and House of Delegates, and the Departments of Natural Resources, Agriculture, Licensing and Regulation, Transportation, State Planning, Economic and Community Development, and the State Fire Marshall's Office, State Police and Civil Defense and Disaster Preparedness Agency.

The council is ruled by a constitution and pursues its goals and duties through subcommittees on Episodes, Long-Range Planning, Economic Impact and Health Effects. The council provides opportunity to develop common action plans between state agencies; shares resources, facilities and data; increases cooperation in compliance and enforcement activities; and has established an "alert" system for handling toxics emergency episodes. Most of the council's efforts are directed toward prevention of future hazards through the development of long-range plans and programs. The council's regulatory approach has been welcomed by state agencies, industry and the public, and may well serve as a national model.

Within the Department of Health and Mental Hygiene's Environmental Health Administration, toxic substances control is primarily administered by the Division of Regulation and Program Development, the Division of Environmental and Industrial Disease Control and the Toxic Substances Registry.

Formally established in January, 1978, the Division of Regulation and Program Development draws personnel and expertise from many state programs. The Division was established in order to integrate and coordinate toxic substances activities which cut across other programmatic lines of the EHA and serves as a resource unit, not only to the Department of Health and Mental Hygiene, but to other state agencies as well. The division reports to the Director of EHA who is also the state TSCA coordinator, and is charged with maintaining EHA liaison with all involved state and federal agencies.

The thrust of the program is to control toxic and carcinogenic substances through the various environmental media (air, land, water, and workplace), operations, products and management functions, with divisional activities increasing research discovers more harmful substances. A major division activity has been an Industrial Survey of Carcinogenics and Toxic Materials. Begun in 1976, the survey identified establishments that use, produce or handle known or suspected carcinogens and selected toxics. It also identified the quantity, composition and methods of treatment or disposal of wastes that contain potentially toxic or hazardous substances. Approximately 150 chemical compounds were selected, with establishments to be surveyed chosen by knowledge of their operations or by their representation of industry types (SIC codes) likely to be using, producing, handling or disposing of toxic substances. Approximately 300 facilities have been surveyed, and of those reporting substantial quantities of carcinogens or toxics, a follow up "discharge inventory" is administered to obtain information on manufacturing methods and control equipment.

Initial data from the survey have been compiled into three summaries and published for use by numerous state regulatory agencies. The Air Quality and Solid Waste Control Programs utilize the survey information on manufacture, consumption and disposal of toxic substances, and the Maryland Occupational Safety and Health Administration utilizes the data to set priorities for workplace inspections. In addition, toxic substances advisories were developed to alert industries of the possible carcinogenic properties of certain toxics;

these alerts were circulated to all 300 surveyed industries with a supplemental reporting form to be returned by those industries using the toxics.

The realization, however, that the survey effort fell short of a desireable degree of comprehensiveness has resulted in an expansion of the program. The new system, referred to as the Toxic Substances Registry, was initially developed through a 1978 TSCA grant in order to expand the inventory by physical sites and quantity of chemicals covered, and to systematize the information into a common data base. A great deal more information has been added to the registry inventory from agencies involved in toxics control, universities, public health schools and cancer centers in the state. The main objectives of the Registry have been to:

1) survey local, state and federal government agencies to determine the exact nature of available data;
2) conduct a literature search and survey other state efforts in this area;
3) design a hierarchical data retreivable structure for users;
4) ensure comprehensiveness of data as a valid base for epidemiological and other investigations;
5) install a Toxic Substances Registry on a central computer accessible to all cooperating agencies through terminals;
6) develop cooperative agreements with various data sources for retreival and maintenance of data; and
7) systematically update data.

The Division of Regulation and Program Development also coordinates monitoring activities of EHA to provide correlation of toxics data with permit actions taken by the department; toxics data from NPDES permits is, for instance, correlated with the industrial chemical survey information in the registry to determine the potential water contamination occurring in the state.

Established in July, 1977, the Division of Environmental and Industrial Disease Control consists of medical, nursing, industrial hygiene and epidemiological experts, and is responsible for developing preventative programs for diseases arising as a result of occupational or community exposures to industrial-related hazards. The Division operates within the EHA, and works with the Toxic Substances Control Program providing medical input and receiving strong technical and scientific support in dealing with environmental problems. The Division serves as both an investigative unit and a consultation service, emphasizing maximum cooperation between industry, labor and public health authorities to provide safe working conditions and adequate medical surveillance of high risk groups. The following are the ongoing activities of the Division:

1) working to design and implement epidemiological studies relating to toxic substances and based on information from the Division of Regulation and Program Development, as well as occupational disease reports and environmental health complaints;
2) developing strategies to study disease patterns among identified high risk groups, and evaluating the availability of appropriate medical care particularly in industry;
3) working to design and implement reporting, surveillance and investigation of industry-related diseases;
4) establishing a medical response unit to address health effects of emergencies involving spills and leaks of carcinogenic and toxic substances;
5) acting in concert with the Division of Regulation and Program Development as consultant to various programs within EHA to monitor and evaluate standards for controlling toxics based on toxicity studies and epidemiological data; and

6) providing medical and technical consultations to industry, labor, physicians and the general public.

Finally, the Division of Cancer Control in the Aging and Chronically Ill Administration has maintained a successful cancer screening program operated through local health departments, and has coordinated medical institutions' reporting to Maryland's Cancer Registry System. Although hampered by past laboratory resistance to reporting requirements, the system should be greatly improved by the Division's attempt to receive cancer related information through alternative channels. Hospital based tumor registries will transmit cancer reports to the state registry promptly upon diagnosis, and the state universities have agreed to assist the Department of Health and Mental Hygiene by helping hospitals develop and maintain their registries and by performing epidemiological studies in high risk areas.

This complex of interagency and interorganizational support activity has substantially strengthened the state toxics integration strategy.

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MICHIGAN

The main focus of Michigan's toxic substances management strategy involves an extensive computerized information system known as the Critical Materials Register (CMR) operated by the Department of Natural Resources' Office of Toxic Materials Control. Its goal is to identify existing or potential toxic substances problems through the analysis of data on toxic substances use, discharge and emission as available in annual CMR reports, Air Priority Chemical reports and other information sources.

CMR information is currently stored in a computer system maintaining data only in a list format. Consequently, the state's first strategy objective is to develop a computer system to sort and analyze all data collected. These data include characteristics of industrial facilities and receiving waters of the state. A computer capacity to store data according to geographical location, specific materials utilized and type and quantity of such material is also needed.

A second objective is to develop a computer system to use secondary sources of toxic substances information (federal as well as inter and intra state data bases) to supplement present CMR data.

The Critical Materials Register was authorized in 1972 by an amendment to the Michigan Water Pollution Act of 1963. A CMR Advisory Committee comprised of environmental specialists from industry, government and the academic community designated by the Director of the Department of Natural

Resources provides advice to the director on the development and revision of the CMR as well as advice and recommendations on the overall toxics program.

The first critical materials list was created in 1971, but as the number of variables, chemicals, industries, etc. expanded, it became increasingly complex. The state then developed a more objective system for selecting chemicals to be listed in the register, and by 1978 had developed a model for evaluating chemicals for possible inclusion on the CMR, based on a numerically scored hazard assessment.

It should be noted that no attempt has been made by the state to list all chemicals which may be hazardous under any or all conditions. The purpose of the register is to develop and maintain a list of critical chemicals from a water pollution perspective. The Department of Natural Resources is, however, beginning to develop a similar air emissions priority list for use by the air pollution program under the authority of the Michigan Air Pollution Act of 1965, as amended. A separate air list is necessary as a result of air pollution regulatory authority being delegated under a media specific statute, as is water pollution control authority. The methodology, purpose and use of the air register will be essentially the same as the CMR; and it is anticipated that a computer system will be developed to integrate the two.

The major use of the CMR involves identifying businesses using or discharging toxic substances into waters of the state in amounts which could cause environmental damage. The ultimate purpose is to target environmental program activities toward preventing potential problems. Facility descriptions and designs are evaluated in connection with the list to determine if the listed materials are likely to be discharged, and whether such discharges are likely to result in environmental degradation. Follow up inspections and analysis may then occur. Other uses of the CMR include:

1) all NPDES permits and applications are reviewed by the Office of Toxic Materials Control in light of environmental and health related information from the CMR in order to avert potential damage from a particular toxic substance;
2) all chemicals listed must be considered in a pollution incident prevention plan developed by each facility using or storing any of the listed materials;
3) the Department of Public Health uses the data to identify potential impacts on human health through exposure to water contaminated by listed materials;
4) the Air Quality Division currently utilizes the data to investigate possible fugitive emissions from critical materials storage facilities and processing facilities; and
5) selective survey/questionnaire mailings are made to obtain information from industry on manufacturing, distribution and disposal practices, and regulation and warning notices are issued to businesses which have listed materials in use and discharge patterns similar to a known problem, in order to rectify, abate or prevent potential environmental/health hazards associated with such industry practices.

The CMR has many cross-media, cross-agency and cross program uses. The register involves the integration of information collected through traditionally media specific programs as well as the integration of information collected by federal sources. It allows the state to organize its environmental programs around the functions of toxics information gathering, analysis, dissemination, use and input into the regulatory process.

In addition, the CMR could be an extremely interesting tool for state managers involved in *prioritizing* those chemicals which need to be most closely watched and controlled. In developing a separate air emissions priority list, the state *recognizes that chemical effects in water and the atmosphere are different*. A report being developed by the Office of Toxic Materials Control describing how the critical materials program was developed, how it was implemented, the computer programs utilized, and the *sampling protocols* and *investigative methods* used, will be valuable when available.

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NEW JERSEY

New Jersey's strategy for comprehensively controlling and abating toxic substances problems involves various state agencies and units of the Department of Environmental Protection (DEP). In 1976 the governor issued a directive mandating a program to reduce the exposure of New Jersey citizens and the environment to carcinogenic and toxic substances. The impetus behind this directive was an increasing awareness of the casual relationship between environmental pollution and human health effects.

The primary unit in the DEP involved in implementing the strategy is the Program on Environmental Cancer and Toxic Substances (PECTS), with the Office of Hazardous Substances Control providing the necessary media specific activities.

The state attempts to distinguish three primary sources of toxic hazard:

1) exposures that occur as a consequence of a catastrophic failure, such as explosion, spill or transportation incident;
2) exposures that result from current routine emissions into the environment from many different sources such as industry, agriculture and motor vehicles; such emissions may be into air or water by way of the solid waste stream and may be continuous or transient phenomona both in time and space; and
3) current exposures that result from previously reduced toxic agents such as abandoned chemical dumps and landfills.

The combined efforts of the PECTS program and the activities of the Office of Hazardous Substances Control attempt to address each of these three major categories. This tri-level distinction between the types of potential toxics problems provide useful goal orientation to state program strategy organization:

The state has identified seven basic functional activities for implementing its toxic substances program:

1) environmental monitoring
2) resource organization
3) problem definition
4) field response
5) regulatory need evaluation
6) internal program integration
7) program integration with other units

As the lead group in DEP charged with conducting an intensive effort to identify the sources, levels and effects of toxics substances in the state and to coordinate the department's overall approach to toxic substances control, PECTS has two major objectives: 1) to look at risk and hazard assessments, and 2) to look at environmental fate. The risk and health hazard assessment section conducts much of the data collection activities and subsequent analyses in order to relate environmental data to human health effects, primarily dealing with carcinogens but also encompassing other types of health effects. The environmental fate section is concerned with the behavior of toxic substances in the environment and their effect on natural resources.

PECTS does substantial monitoring. However, due to the fact that toxics substances data are very limited in New Jersey, PECTS placed heavy emphasis on designing, contracting for and analyzing results from environmental projects for the first two years. PECTS thus made broad surveys to toxics compounds in the environment its first priority. Preliminary monitoring surveys conducted by New Jersey include:

1) the use of state-related data from an EPA analysis of air samples for volatile organics, and preparation of a table showing compounds found in New Jersey samples with some frequency and in fair high concentrations;
2) collection and analysis of air samples for the presence of lead and other heavy metals using atomic absorption techniques; collection of additional air samples of volatile organics and analysis thereof for selective carcinogens and toxics; subsequent preparation of charts listing the number of samples taken per metal and per organic compound and the range of median concentrations of those samples;
3) sampling and testing of over 400 public and private wells in 21 counties for carcingenic compounds considered potentially hazardous to human health and the environment; results of the organics, pesticides and metals analyses showed several cases where federal drinking water standards were not met for pesticides and organics, and 12 instances where standards were not met for metals; and
4) a series of shell and fin fish samples were also collected at various locations around the state in order to determine the PCB levels in their tissues.

PECTS is also involved in evaluating chemical risks through statistical studies of health effects in the state. The state hopes to determine which environmental and community variables are most clearly associated with a particular disease by collecting demographic, mortality, industrial and geological data and by sponsoring an extensive project to correlate this wide range of environmental, occupational, ethnic and social variables with mortality in the state and surrounding region. The state has examined:

1) National Institute of Health statistics showing New Jersey near the top of the nation in total cancer death rates for both sexes and both whites and non-whites;
2) toxic chemical problems derived from the large number of serious spills, explosions and other accidents;
3) its chemical industry in a national perspective and how it ranks in terms of the number of chemical facilities, new capital expenditures, and number of employees;
4) lung cancer studies and their relation to air pollution and water pollution (especially one conducted in Louisiana relating suspected and known carcinogens to polluted drinking water from the Mississippi);
5) infant mortality rates in New Jersey as compared to the whole nation from the National Center for Health Statistics (NCHS); and
6) state and national rates for selective cardiovascular diseases that are age standardized and compiled by NCHS.

To assist PECTS in its information gathering and analysis activities, the state has acquired the use of a powerful and easily used computer system called UPGRADE. Developed by the President's Council on Environmental Quality, UPGRADE is used for analysis of graphic and statistical data combined with health and environmental data. PECTS is expanding UPGRADE to include the health and environmental data gathered by New Jersey DEP as well as other states. New Jersey was also the first state to utilize the UPGRADE system.

The PECTS program also includes the Toxic Substances Information Center, with the UPGRADE system constituting a major element of the center. The Resource Center has resulted from a state recognition that:

1) regulatory agencies require current data in order to assure that their decisions are made on the basis of most recently available data;

2) vast amounts of information from a wide variety of sources need to be integrated into a comprehensive and usable form for technical as well as policy and decision-making staff;

3) emergency situations require, in a short period of time, concise information regarding chemicals and their effects.

Information stored in the center includes:

1) conventional library materials with specialized selections of reference books and journals,

2) documents on toxic substances, carcinogens and other relevant substances generaged from outside the department,

3) internally generated documents, maps, etc.,

4) on-line computer information retrieval systems for technical data and literature searches,

5) an automated data base built around the UPGRADE computer system, and

6) on-line computerized catalogue of the complete resource center with extensive referencing abilities.

The state recognizes that one of the areas posing a substantial difficulty for all state regulatory agencies working to control toxics has been the synthesis of diverse scientific, technical, economic and social data necessary for sound regulatory decision-making, especially in integrating epidemiological and monitoring data as a means of setting regulatory priorities. The Resource Center has the potential for providing New Jersey with new choices for improving communications and interactions among state and federal agencies in toxics control.

The DEP's Office of Hazardous Substances Control, as the second integral component of the toxics strategy, is charged with on-site response to hazardous substances spills and other emergencies, in addition to coordinating the department's efforts to ensure the integrity and safety of facilities utilizing large quantities of hazardous substances. Each specific division (air, land, water, pesticides) located within the Office of Hazardous Substances Control is responsible for the development, implementation and enforcement of the DEP's overall toxic substances strategy.

The Office was organized in 1970 as the overall coordinator for hazardous materials disposal, but its duties were expanded in 1977 in order to meet the mandate of the state Spill Compensation and Control Act. The office's spill/emergency response, containment and cleanup activities and review of industrial facilities' spill prevention plans is supported by the Spill Compensation Fund generated by a tax on transporters of hazardous materials between major New Jersey facilities. The Emergency Spill Response Unit in the office operates sophisticated laboratory facilities and sponsors numerous emergency response seminars and training courses for local fire, law enforcement, trade and government groups.

An Engineering Review Group in the office conducts technical reviews of industrial spill prevention and cleanup plans, and reviews water quality certifications, permits and grant applications as part of an interdepartmental consolidated permit process.

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NEW YORK

New York's present strategy for controlling toxics focuses primarily on developing statewide technical procedures for locating past and present sources of toxic substances contamination, assessing their impacts, and developing management techniques for controlling toxic substances problems that will integrate the responsibilities of state and local governments, and to assure coordination with federal programs. This strategy has developed over the past three years, and is the result primarily of the state's awareness that technical and management deficiencies existed in state environmental pollution control programs.

The state has identified four toxic substances problems underscoring the need for a toxic strategy which is presently being developed:

1) the existence of chemical waste dumps in Niagara and Erie Counties requiring remedial engineering and population resettlement action;

2) mercury contamination of fish in Syracuse's Onondaga Lake from industrial discharges resulting in a prohibition on fishing;

3) PCB contamination of fish in the Hudson River Valley (from Hudson Falls to New York City) resulting in restriction on sport and commercial fishing in the Valley; and

4) contamination of a sole source groundwater aquifer on Long Island by chlorinated hydrocarbons resulting in well use restrictions and a continuous testing program.

The existing toxics control strategy is based on the toxicological and laboratory expertise of the state Department of Health and the regulatory and resourse management powers of the state Department of Environmental Conservation (DEC). The Office of Toxic Substances was established in 1978 in the executive branch of DEC to provide leadership, coordination, strategy development and program planning expertise to the other agencies and divisions within DEC on toxic substances issues. While the actual implementation of the strategy rests with a wide variety of program divisions, the Office serves as the department's focal point for interaction with other state and federal agencies, industry, citizens and the scientific community.

Over the past three years, New York's toxics strategy has based its activities around three major programs:

1) an industrial chemical survey which identifies chemicals in use in the state according to industry, county and watershed, and is based on a survey of 5,000 industries conducted in 1978. The information is presently computerized and referenced according to the chemical abstract reference number;

2) a statewide fish monitoring program analyzing a variety of fish species for the presence of heavy metals and a variety of chlorinated organic chemicals. Over 100 monitoring stations are included covering all major waterways; and

3) a track-down program utilizing a variety of techniques including the analysis of macro invertebrates grown in artificial plastic environments as a means of locating the sources of toxic substances pollution to a water body.

At present, New York is focusing on developing a systematic procedure to locate potential toxic substances in the environment, assess their environmental and public health significance, and develop rational management procedures. On the scientific technical level, the state is developing relatively simple, inexpensive chemical screening procedures that would allow broad classes of toxic substances to be analyzed in sediments, waters and biotics. On the management level, the state is attempting to extend the range of presently known or available toxic substances management techniques and to adapt them to local governments. A pilot program is attempting to develop these testing methods and procedures and the needed management relationships to deal with toxics in Erie and Schoharie counties. It is anticipated that these procedures, techniques and management plans will then be applied on a statewide basis to control toxics problems.

The pilot program is comprised of six major components:

1) research and development: the state will be utilizing its industrial chemical survey reviewing it in light of known toxicological hazards in the counties to determine the broad classes of chemical substances appropriate for scan tests. Effective, simple and relatively inexpensive approaches to developing scan tests will be particularly examined, including training locals to collect and analyze samples;

2) county-wide surveys: historical information, the industrial chemical survey, the state hazardous waste survey, NPDES permit information, etc. will be utilized here as well as including the state's inter-agency hazardous waste disposal task force and the Erie County interagency toxic substances task force;

3) county-wide sampling and analysis will be conducted utilizing screening techniques identified in the research and development phase as well as current practices;

4) priority rankings will be determined to narrow the list of potential toxic substances problems to those with apparently significant impacts warranting further investigation;

5) in-depth investigations of these top priority problems;

6) management alternatives and plans which will include: deciding on objectives, examining alternatives, describing the optimum management steps needed, agreeing on responsibilities for each step, calculating costs and time incurred and calculating expected benefits.

The Office of Toxic Substances has been operating as a coordinative program within the DEC for several years, and there appears to be no move to alter the existing organization. The state does, however, see the need to develop more efficient, effective management and technical procedures to operate within this existing structure and has developed a fairly comprehensive strategy to address these needs. The New York six-pronged strategy addresses a wide range of operations (information gathering, research, procedures development, sampling, screening, investigation, etc.) which will be applicable to all environmental media.

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NORTH CAROLINA

North Carolina is initiating a broad toxic and hazardous substances management strategy based on the recognition that hazardous wastes represent only a fraction of the total chemical problem in the state. A growing realization that toxic and hazardous substances are produced and used in a variety of ways that may be injurious to human health in the short and long run, combined with occurrences of such incidents as midnight dumping of PCBs and other illegal disposal practices, have triggered the state initiative to implement a comprehensive toxics control strategy.

The impetus for a comprehensive strategy dates from PCB spills along a North Carolina highway in 1978, when complex management questions for the governor's office and state agencies responding to the spills were raised. Confusion over responsibilities and authorities spurred the governor to issue a staff directive to develop a management strategy for the coordination of chemical management functions within the state. Two presidential management interns were subsequently employed by the state to assist in the development of a comprehensive management strategy.

The North Carolina strategy combines two efforts: a governor's task force on hazardous and low-level radioactive waste, and a state toxic substances project. The governor's task force is supported by advisory groups concentrating on hazardous wastes, low-level radioactive wastes, public information and research. The task force is presently preparing a plan for safely managing hazardous and low-level waste in North Carolina in conjunction with implementing the Federal Resource Conservation and Recovery Act of 1976.

The Toxic Substances Project is a complimentary project partially funded under a Section 28 TSCA grant with four major objectives:

1) to develop a profile of chemical substances produced, used and accumulated as waste in North Carolina;

2) to assess the human health effects of selected substances profiled (i.e., those deemed likely to have significant adverse health effects);

3) to identify sources, levels and duration of human exposure in North Carolina to the selected profiled substances;

4) to develop and begin implementing a plan to control these substances for which adverse effects are judged to exceed beneficial use. This control may range from production shut-downs to production and use practices guidance and modification of disposal methods.

The scope of this project, which is the cornerstone for the comprehensive strategy, covers all state management functions from policy development to enforcement, examining all elements of the chemical life cycle (manufacture, use, processing, transport, sale and disposal), involving all levels of government (local, state and federal), as well as the citizenry, media and private industry.

The intent of the strategy is to use actual experience as a basis for determining how best to meet state responsibilities for controlling toxic substances. This will ultimately form the basis for future executive or legislative toxics control action. Under the state TSCA grant, this strategy is implemented through an automated information system. Data to be collected by the state under this project includes:

1) groundwater data from the Department of Natural Resources and Community Development, including geological, hydrological and soil base data;

2) river and stream quality data;

3) chemical data using federal SIC codes, state gathered information on chemical plant locations in the state, the amount and size of the plants, types of chemicals produced, location and characteristics of chemical storage sites in the state and statistics on the transportation of chemicals in the state;

4) population/demographic data for siting and exposure level determinations; and

5) other existing national and international chemical-related data bases.

The primary element of the management information system is a priority ranked inventory of chemicals manufactured in North Carolina, based on a NIOSH occupational hazard survey and the North Carolina list of manufacturers. The Research Triangle Institute at North Carolina State University will compile the chemical inventory and prioritize a list of 1,000 chemicals with background summaries for each. The chemicals will be given a rating or chemical priority number based on the following factors:

1) the total volume of the substance produced or used in the state;

2) the volume of the substance produced by county;

3) the severity of potential harm to human health or the environment attributable to the chemical.

A specific aspect of this inventory will be the close examination of the six largest hazardous chemical users and/or producers in the state already identified by the Department of Human Resources' survey on hazards involved in handling chemical wastes. Here, the emphasis will be placed on manufacturing characteristics and the specific chemicals associated with these industries.

All the data collected is to be computerized, and the data base of the prioritized chemicals will be combined with the additional data bases described above. The total management information system is designed to be interactive in nature, and will assist decision-makers in taking investigative or regulatory action. By developing an extensive chemical data base (incorporating chemical properties, adverse health effects, prevailing conditions of exposure, etc.) the state will have an improved analytical procedure and organizational basis to determine the level of monitoring, enforcement and regulation necessary to safely control toxic substances in the state.

The state has formed an interagency coordinating body to provide overall guidance to these specific toxics-related programs. The coordinating body is comprised of representatives from existing state agencies involved in toxics control. In addition, various groups will be formed within this body to address specific toxics problems (health effects monitoring, hazardous waste disposal, environmental impact assessment), drawing from the member agencies with expertise in the specific issue areas being addressed.

Thus, North Carolina appears to be well on its way to implementing an integrated management strategy for controlling toxic substances. In doing so, the state has employed a reorganizational strategy not unlike other integrated strategy states such as Oklahoma and Arkansas in which an interagency coordinating body comprised of existing toxics-related agencies is utilized. The North Carolina Toxic Substances Project is the cornerstone of the strategy, with the chemical management information system being the major focus of the project.

While integrating the activities of various state agencies, private industry and the public, North Carolina is focusing on all aspects of chemical management -- production, use, processing, transport, disposal, monitoring, enforcement, regulation, etc. In this regard, the state acknowledges the need to understand and be prepared to handle present and future toxics problems, and acknowledges that a comprehensive management strategy is the most effective and often most cost efficient means of controlling dangerous chemicals.

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OKLAHOMA

Oklahoma's management strategy for controlling toxic substances is based on the Oklahoma Pollution Control Act of 1968 as amended, establishing a Pollution Control Board to coordinate activities of member agencies and organizations. The Pollution Control Act broadly defines "pollution" and "the environment," and the Pollution Control Board has been delegated far-reaching authority to prevent and abate pollution throughout the environment.

The Pollution Control Act also mandates that the Department of Pollution Control act as the "executive arm" or overall coordinator for the Board. Originally created to address water pollution issues, the Board has been expanded in its membership and responsibilities to encompass virtually all environmental and health-related programs carried out in Oklahoma. A total of nine members comprise the Board with two citizens and seven representatives from state agencies. At least ten monthly meetings are held with five members needed to constitute a quorum, and the state attorney general acts as legal counsel.

The Board's mandate was extended in 1971 to improve coordination of environmental pollution control programs. The Board, with the Department of Pollution Control acting as its executive arm, has the authority to act on its own initiative in certain situations and has the following specific responsibilities:

1) to coordinate and eliminate duplication of agency efforts;

2) to compel member agencies to investigate and file reports on suspected pollution;

3) to conduct studies, investigations, research and demonstrations for the prevention of environmental pollution;

4) to assume jurisdiction in a pollution problem when an agency fails to meet its responsibility, when no agency has legal jurisdiction or when there is an overlap or conflict in authority;

5) to hold hearings, issue notices, subpoenas, administer oaths, and take testimony as necessary for enforcement;

6) to provide the opportunity for a complaint to be heard before the board;

7) to establish and maintain central reporting for all rules and regulations;

8) to maintain an up-to-date record of the availability, acquisition and disposition of all federal, state and other monies;

9) to establish and maintain a system whereby a citizen reporting a violation to the board passes the report on to the proper agency, and maintains records of actions taken on each reported violation; and

10) to conduct educational training programs related to pollution.

The Department's executive responsibilities include coordinating all pollution control activities of other state agencies, as well as being designated the lead planning agency for the state's comprehensive water quality management plans and the implementing regulatory agency for the federal Clean Water Act, Clean Air Act and the Resource Conservation and Recovery Act. Other member agencies of the Board, and their respective responsibilities, include: the Oklahoma Water Resources Board whose duties presently include consideration of revisions involving more stringent standards for toxic substances and establishing groundwater standards; the state Department of Health's Water Quality

Laboratory which performs chemical analyses of public drinking water supplies; the state Department of Agriculture which regulates pesticides and fertilizers and operates its own analytical laboratory; the Conservation Commission which compiles information and conducts studies on the relation of district programs to one another and other resource conservation programs in the state; the Industrial Development Department which supports and assists interested parties in developing new and expanding existing industrial facilities in the state and provides environmental regulatory information to industry; the state Department of Wildlife Conservation which enforces pollution control laws in protecting fish and wildlife and is responsible for determining the value of any forest or wildlife losses for recovering damage costs for the state as well as individuals.

Additional Board responsibilities include requirements to continue studying the feasibility of coordinating and combining state pollution control activities and to submit an annual progress report with any recommendations to the Oklahoma Senate and House. Also, the act mandates that any research information made available to the Board be transmitted to the Continuing Education Center for Ecology Information at East Central State College, and made available to the public upon request.

Toxics concerns are woven into this broad integrated environmental strategy through various toxics evaluation programs. The state Department of Health has laboratory instruments capable of reading very low levels of toxics in air, water, and food. When this equipment is on-line in the state's Water Quality Laboratory, virtually any toxic substance can be tested for within these media.

The Air Quality Service in the Department of Health is actively working to control lead emissions from facilities in Stillwater and Bartlesville, and is evaluating air emissions of mercury and arsenic. The Water Facilities Engineering Service has specific pre-treatment requirements for waste water treatment facilities. The Water Quality Laboratory collects and analyzes fish, water and sediment from selected monitoring sites; special evaluation of PCBs at two locations in the state resulted in an additional Health Department appropriation to purchase needed analytical equipment to continue the study. The lab also provides analytical and technical support in the event of a toxics related spill or emergency. The Consumer Protection Service operates food control programs to prevent toxics from entering the food chain in the manufacture, processing or sale of food products; milk, for example, is periodically tested for the presence of pesticides, herbicides and antibiotics. The Environmental Protection Service has a plumbing program (the Cross Connection Control Program) designed to test plumbers on their ability to prevent back siphonage of toxic materials from sewers and water supply systems, as well as training and certifying water or waste water treatment plant operators in ways to avoid toxic contamination of water supplies, streams and lakes.

The Occupational and Radiological and Health Service investigates and assists individuals accidentally contaminated by toxic substances in the home or workplace.

In addition to these on-going program activities, the state engages in the following specific toxic evaluation programs:

1) the Industrial Waste Division of the Industrial and Solid Waste Service determines the environmental effects of actual or potential leachate or industrial waste discharge; investigates toxic material complaints; and assists other agencies in disposing of unusual chemicals (e.g., state school assistance in disposing of old chemicals).

2) the Environmental Epidemiology Division within the Epidemiology Service was established in an effort to develop an interdisciplinary approach involving the environmental and medical aspects of toxic exposure. The Division serves as a consultant on any toxics problem encountered by the state, assists in problem evaluation design and data collection. Data are used to prepare reports, fact sheets and public information material. In addition, the section serves as an information source through its development and maintenance of a toxics reference library and resource contact list of other state and federal agencies.

Oklahoma appears to have successfully initiated a toxics integration management strategy through a three-pronged procedure. First, a relatively comprehensive general piece of environmental legislation was enacted - broadly defining what is considered the environment and pollution within that environment. Next, the act instituted a Pollution Control Coordinating Board responsible for overseeing the protection of that environment and the abatement and prevention of pollution. Finally, the Board is comprised of a wide variety of state agencies involved in both health and environmental concerns generally, and toxics control specifically. As a result, the state's existing regulatory, agency structure remains primarily unchanged - with toxics monitoring and abatement activities occurring within existing agencies - and the Board serves as the mechanism for coordinating these agencies and programs under the single concept of toxic substances.

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PUERTO RICO

Puerto Rico's Environmental Quality Board (EQB) is currently developing an integrated toxic substances control strategy and a coordination mechanism funded, in part, by an EPA Section 28 grant under the federal Toxic Substances Control Act (TSCA). Although EQB has individual programs for toxic substances control with regulatory powers, legislative authorities and administrative organizations for information gathering, control and enforcement actions, the current toxic substances activity represents a mix of commonwealth and federal agency involvement with a media specific focus. The commonwealth, however, feels that integration is needed to ensure comprehensive treatment and an action focus that is not duplicative in design and implementation.

Factors such as the conflict between economic development and increased potential for toxics control problems, the occurrence to toxic crises such as the mercury contamination of Los Corozos Creek, and worker exposure to dangerous levels of birth control hormones and mercury and studies examining the correlation between chemical exposures and pulmonary and cardiovascular diseases have prompted the recognition of the need for a comprehensive strategy to control toxic chemicals. A sound toxics strategy is seen as a mechanism by which Puerto Rico could prevent the occurrence of similar problems in the future, mitigate any future crises that may result from the trends noted above, and define a mechanism for handling health and environmental emergencies in the event they cannot be prevented.

The proposed toxic substances control program includes the following goals:

1) development of a toxic substances control strategy that coordinates Puerto Rico's efforts to limit human and environmental exposures to toxins;

2) development and establishment of coordinative mechanisms to carry out the strategy that takes into account the coordination of various pollutant sources and environmental inventories being presently conducted or contemplated for the future;

3) development of chemical and toxic problem area priority lists;

4) implementation of the established coordinative mechanisms on order to control the top priority chemical and toxics problems;

5) development of a pollutant incident prevention plan to better enable the commonwealth to respond to health and environmental emergencies;

6) development, establishment and promotion of an active public participation plan to provide for citizen input into the EPA/EQB decision-making process; and

7) evaluation of project effectiveness.

The Public Policy Environmental Act of June 18, 1979, as amended, established the EQB and gives Puerto Rico broad authority to protect health and welfare, prevent environmental degradation and enhance the relationship of man with the environment.

The toxics program will be managed by EQB's Solid and Hazardous Waste Office, and in conjunction with the goals outlined above, the office will examine the role of state and local governments in toxic substances management and intends to coordinate its toxics program activities with relevant activities of other state and federal agencies. While attempting to create a better management system for toxic substances problems, Puerto Rico will be looking for ways to lessen the economic burden on industry as well.

Although Puerto Rico's strategy is in the development stages it indicates the commonwealth's commitment to promote formalized coordination and cooperation in environmental management that will link together programs and activities presently organized around media specific lines, provide cross agency information sharing and promote federal/state/local/citizen/industry interaction in an effort to confront the need for controlling toxic chemicals.

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VIRGINIA

Similar to other integrated state strategies, Virginia's focus is on developing an extensive information gathering system on the nature of chemical use in the state. The Virginia Toxics Information Act of 1979 defines its purpose and scope of state information gathering activities on a broad enough basis to encompass all aspects (media, operations and products) of toxic substances control.

Virginia approaches toxics control on primarily a preventative basis. Prevention measures are viewed as those designed to protect a variety of organisms, including animals, humans and plants, as well as inanimate materials and structures.

The state has the authority to:

1) inspect chemical-related industries;
2) enter premises for inspection;
3) assess penalties for violations of the act;
4) require industry to disclose information; and
5) provide for the confidentiality of industry information by state officials.

These activities are administered by the state Board of Health, the state Health Commissioner and the state Department of Health, which assumes major responsibility as the state toxic substances information agency. As such, it assumes the following powers and duties:

1) developing and operating a system of reporting substances posing a high or unreasonable risk to health or the environment;

2) collecting information from any source on toxic substances to avoid possible duplication of reporting activities;

3) cataloging the information collected;

4) instituting proceedings to compel information disclosure;

5) reviewing and evaluating information to determine if it is relevant material for making toxicity determinations;

6) promulgating a list of Class I substances as those determined from toxicological and other scientific data to pose the greatest threats to human health or the environment, specifying the amounts that pose such risks; and

7) providing documentation to support the list, giving notice of such a listing and holding public hearings.

The Toxic Substances Advisory Council was established to review and evaluate policies with respect to toxic substances, make recommendations to the Board and provide technical assistance and advice as needed. It consists of five appointed members and twelve ex-officio members. The Governor appoints one member each from the areas of agriculture, medicine, labor, industry and local government. Ex-officio members are chairpersons of the following state organizations: Water Control Board, Air Pollution Control Board, Board of Conservation and Economic Development, Labor and Industry, Marine Resources, Agriculture and Consumer Services and the Council on the Environment. Thus, the Council is very much an interagency advisory group combining representatives from a wide variety of environmental and health interests and encompassing the media, product and operation of the specific program and its activities.

Other important elements of the strategy include the requirement for an annual report on the status of toxics control made to the Virginia Assembly and Governor. This report, by outlining such aspects of toxic substances control as federal activities in the state, applicable federal statutes, state organizational set up for coordinating toxic control activities and description of specific state toxic substances program activities, serves as an excellent coordinating tool in itself, not seen in other state toxic integration strategies. By detailing the toxics activities and organizational structure in Virginia, the state has essentially developed an accessible annually updated directory for state and local officials to determine who has authority and responsibility in a specific area of toxic substances control.

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WISCONSIN

Wisconsin's strategy focuses on the development of a model state program in environmental epidemiology. The Environmental Epidemiology Section of the state Department of Health and Social Services applied for a Section 28 TSCA grant in 1978 to develop this model program to identify, investigate and alleviate or minimize toxics effects on the public and the worker, with special priority given to protecting fetuses, infants and children. The program's objectives include:

1) identifying the negative health effects and minimizing adverse toxic exposures;

2) conducting epidemiologic investigations into the casual factors of human morbidity or mortality;

3) coordinating state activities to alleviate or minimize exposure to toxics;

4) ensuring accurate laboratory analyses on or of toxics;

5) participating with the University of Wisconsin Preventative Medicine Department and other state departments and the State Medical Society in developing a center for the physiological/psychological evaluation and diagnostic workup of individuals suffering from adverse reactions to toxics; and

6) determining the extent and adequacy of existing toxics regulations and sampling procedures.

The Section proposed a six-pronged plan to implement these ojectives:

1) the expansion in scope and depth of the study of formaldehyde vapor related health problems. Study staff had already experienced difficulty in developing a research design and methodology for determining the influence of temperature, ventilation, humidity, etc. on testing procedures, pointing out the need to expand the scope and depth of the state's environmental epidemiology program;

2) provision of diagnostic and laboratory services as necessary support for the environmental epidemiology program. As a result, a model plan specifying the minimum diagnostic and laboratory services needed by a state environmental epidemiology department, its cost, types of professionals and extent of educational training required would also be developed;

3) development of a computerized cancer and birth defects surviellance system able to automatically indicate any specific cancer or birth defect that is occurring beyond expected levels based on past trends and a comparison to similar areas of the state;

4) development of a rapid access information retreival system, cataloguing and indexing the Section's extensive information files into a single interactive computer system;

5) development of model interdepartmental agreements to be used between state agencies to clarify roles, jurisdictions and relationships between departments; and

6) development of a model state emergency health response plan for hazardous materials spills, fires or explosions including provisions for evacuation responsibilities, reporting mechanisms for health officials, duration of environmental monitoring after an emergency, early warning surveillance mechanisms, etc.

The expansion of the formaldehyde vapor project was the only portion of the proposal specifically funded by a US EPA TSCA grant in 1978. The state Department of Health and Social Services did, however, reorganize itself under the Division of Health to include the Section on Environmental Epidemiology charged in general with identifying and controlling toxic and hazardous substances found in the environment, defined as the occupational, recreational and residential settings of Wisconsin citizens.

Specific environmental health areas in which the Section has already documented problems include:

1) multiple reports of in-home exposure to formaldehyde vapors from foam insulation and/or particle board;

2) four episodes of human illness (one fatal) related to gases emanating from liquid manure systems (currently unregulated);

3) Sheboygan River contamination by PCBs with fish registering levels well above FDA tolerance levels;

4) landfills near Milwaukee adversely affecting private water wells where only standard water analyses completed but reported occurrences of illness;

5) significant increase in lung cancer, stomach cancer and cardiovascular disease reported, with the state aware of the need to study the taconite problem resulting from a high level of use of pesticides by grain elevators;

6) significant excess of angiosarcomas (liver cancer) that the state suspects may be linked to the existence of state lakes heavily treated with arsenic; and

7) a 70% attack rate at a Wisconsin high school from solvent exposure during a roof replacement.

The Section has initiated interdepartmental activity on environmental health issues through discussions on a number of topics including:

1) the feasibility of adding occupational questions to birth certificates, to the history form for the state Early Periodic Screening, Diagnosis, and Treatment Program (EPSDT), and to information collected on infants with metabolic defects;

2) adding laboratories involved in toxic substances testing to the Division of Health's Laboratory Certification and Proficiency Testing Program; and

3) a total and comprehensive revision of disease reporting statutes with the Communicable Disease Section.

At the present time, death certificates with toxic substances involvement are regularly reviewed. questions about lead exposure are now asked on all children screened by the EPSDT Program and blood tests are done for lead on a pilot basis, and the Bureau of Prevention morbidity newsletter carries information to local health departments, hospitals, doctors and the public on health problems related to toxic substances.

At the interdepartmental level, beyond representing the Department on multi-departmental activities (Pesticide Technical Advisory Council, Governor's Task Force on Hazardous Materials Incidents, Governor's Task Force on Hazard Abatement), the Section has already established a close working relationship with various programs in the Department of Agriculture, Natural Resources, Justice, Energy, Transportation, Emergency Government and Industry, Labor and Human Relations.

This strategy advanced by Wisconsin's Department of Health and Social Services emphasizes the need to place health effects surveillance and research at the same level as environmental pollution control programs. It is the state's position that the epidemiologic approach to disease prevention and control, although known and successfully applied throughout the state for communicable disease control, has not really even begun its development for environmentally caused health problems. And while the problems of environmental epidemiology are extremely complex, with appropriate methodologies still in need of development, the state views the utilization of epidemiologic techniques in each state for communicable disease control as an unquestioned indicator that the same technique could be applied in each state's environmental field.

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State Umbrella and Other Noteworthy Toxics-Related Legislation

This portion of the report reviews several pieces of state legislation that either directly mandate procedures for controlling toxics or provide examples of comprehensive "umbrella" legislation delegating broad operational and management authority to the state for controlling pollution in all environmental media.

CONNECTICUT

Connecticut has enacted legislation covering reporting, labelling and notification requirements for manufacturers and users of carcinogenic substances. Chapter 340d, Section 19-169q of the Connecticut Codes mandates that any individual who uses or produces any carcinogenic substance in the manufacture of any chemical, product or material must file an annual report to the Commissioner of Environmental Protection and the Commissioner of Health Services. This report must include:

1) the method of disposal of any waste generated by the manufacture of such item, product or material;

2) the amount of each such carcinogenic substance used or produced during the preceding year;

3) the amount of each such carcinogenic substance currently being held in inventory; and

4) the method utilized to transport such carcinogenic substance.

Public Act Number 80-130 provides a listing of chemicals/elements considered to be carcinogenic substances, including "all others determined to be carcinogens."

Connecticut Public Act Number 80-257 establishes information and notification requirements for employers in the state using carcinogenic substances in the workplace. The act requires every such employer to:

1) post a list of all carcinogenic substances as described above which he/she uses or produces in manufacturing any item or for purposes of research, experiments or treatments of any kind. The list must be readily available for employee viewing and updated to reflect any changes in the state list of carcinogens within 90 days;

2) furnish to each employee upon offer of employment, or on January 1 of each year, a list of all such carcinogens and the danger inherent in an exposure to such a substance; and

3) provide education and training programs for new employees during their first month of employment, adequately describing the presence of such carcinogens in the workplace and proper methods of avoiding harmful effects from such substances by keeping exposure within allowable limits.

Connecticut's Public Act Number 80-398 specifies labelling requirements for hazardous substances which prohibit:

1) the introduction or delivery for introduction into commerce of any misbranded or banned hazardous substances

2) the alteration, mutilation, destruction, obliteration or removal of the whole or any part of the label of a hazardous substance if such act is done while the hazardous substance if held for sale after shipment in commerce and results in the hazardous substance being misbranded or banned;

3) the receipt in commerce of any misbranded or banned hazardous substance and the delivery for payment or otherwise;

4) guaranteeing that substances delivered or sold are labeled properly;

5) the failure to allow entry and inspection legally required, or failure to permit the authorized copying of records: and

6) the introduction into commerce, delivery or receipt of a hazardous substance in a reused food, drug or cosmetic container or a container not identified as reused but identified as food, drug or cosmetic container; this will result in the substance being considered a misbranded substance.

In addition, Public Act Number 80-464, Section 1 requires any industry, manufacturing firm or corporation (except retail pharmacies) which mixes or produces for commercial sale any elements or compounds listed in 40 CFR 116 and designated as hazardous substances in Section 311 of the federal Clean Water Act to submit a list of all elements or compounds mixed or produced during the past year to the Health Director in the town, city or borough where such elements or compounds are mixed or produced within 30 days of the director's request.

All records developed under these various information disclosure requirements are subject to public inspection, although there is a provision for the state's maintenance of industry trade secrets. This set of carcinogenic and hazardous substances information disclosure acts is unique in its attempt to focus on a particular class of chemicals, carcinogens, stressing both their adverse health effects, and their commercial and occupational utility.

The cumulative effect of these statutes is to make employers, as well as employees, aware of the health effects associated with certain chemicals with which they work, thereby controlling their potential adverse effects. The statutes also have a comprehensive application applying to activities in all environmental media, addressing a wide variety of management functions (inspection, reporting, education, training) and operations (manufacture, sale, use, transport, disposal).

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ILLINOIS

The Illinois Environmental Protection Act of 1970, as amended, is a comprehensive "umbrella" environmental statute. Its purpose is: "to establish a unified statewide program supplemented by private remedies to restore, protect and enhance the quality of the environment and to ensure that adverse effects upon the environment are fully considered and born by those who caused them." The statement of purpose also recognizes that: "air, water and other resource pollution, public water supplies, solid waste disposal, noise and other environmental problems are closely interrelated and must be dealt with as a unified whole in order to safeguard the environment."

This Act mandates using all environmental media, management functions and resources to coordinate and consolidate state environmental protection programs. In this respect, the act enables the state to focus on toxic or hazardous chemicals as the pervasive element in all environmental pollution concerns, instead of focusing on the individual environmental mediums adversely affected by chemical pollution.

The Act includes general provisions such as:

1) descriptions of the duties and responsibilities of the Illinois Environmental Protection Agency and the Pollution Control Board (both established to carry out the act's mandate);

2) the confidentiality of trade secrets;

3) public inspection of government records;

4) enforcement procedures and requirements;

5) permitting procedures and requirements;

6) penalties for violations of the act and implementing regulations; and

7) judicial review of Agency and Board determinations.

Broad definitions of pollution in the various environmental medias of air, water, land, refuse disposal and atomic radiation are also included. For example, chemical contaminants are incorporated into the general water pollution definition:

- "such alterations of physical, thermal, chemical, biological or radioactive properties of any waters of the state or such discharge of any contaminant into any waters of the state as will or is likely to create a nuissance or render such waters harmful or detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational or other legitimate uses or to livestock, wild animals, birds, fish or other aquatic life."

The act also encompasses the health-related implications of chemical exposure in the environment in its definition of acute hazardous waste:

> "a hazardous waste that has been found to be fatal to humans in low doses or in the absence of data on human toxicity it has been shown in studies to have an oral LD50 toxicity of less than 50 miligrams per kilogram and an inhalation LC50 toxicity of less than 2 milograms per litre or a dermal LD50 toxicity of less than 200 miligrams per kilogram or is otherwise causing or significantly contributing to an increase in serious, irreversible illness."

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OKLAHOMA

The Oklahoma Pollution Control Act of 1968, as amended, is a comprehensive state environmental statute designed to improve coordination and consolidate environmental programs and activities. In this regard, the act serves as a type of "umbrella" statute encompassing all environmental media, relevant laws, agency activities and responsibilities. Through its broad definitions of "environment" and "pollution," the act lays the foundation for a comprehensive, integrated state approach to managing toxic substances.

In the Act, "environment" encompasses the outdoor atmosphere on and under the surface of the land and waters of the state. "Pollution" of this environment includes the presence of any substances or contaminants, including noise, in quantities which are or may be potentially harmful or injurious to human health or welfare, property or plant and animal life.

To implement control and abatement of environmental pollution, the statute establishes an Oklahoma Department of Pollution Control and a Pollution Control Coordinating Board to enforce all relevant environmental protection laws and to promote the maximum utilization of existing resources in state agencies having existing and subsequent pollution control responsibility. Thus, by including all environmental mediums, state agencies, relevant laws and functions, this integrated act is designed to compensate for deficiencies or inconsistencies in existing media-specific pollution control laws and regulations. This is primarily accomplished by detailing the authorities and responsibilities of the Coordinating Board in conjunction with the Department of Pollution Control, including:

- coordinating management functions
- eliminating duplicative efforts
- compelling state investigations
- entering into interagency agreements regarding the acquisition of scientific, technical and administrative services
- collecting and disseminating information among agencies and the public

The act specifies information gathering and reporting requirements similar to Virginia's Toxic Substances Information Act. It requires that the Department of Pollution Control:

1) establish and maintain a central repository for rules and regulations pertaining to pollution control in the state;
2) maintain a record of the disposition of federal and state funds for pollution control activities;
3) establish and maintain a system for citizen report of violations of pollution control laws and regulations; and
4) establish a public information program on environmental management.

Representatives of the Pollution Control Coordinating Board are also authorized to enter and inspect any property, premises or establishment, except those used exclusively as private residences, where a contaminant source is located, constructed or installed to ascertain compliance with state laws and regulations. The act also requires all confidential business information regarding trade secrets, production methods, etc., discovered during inspections or investigations to be withheld from public hearings and kept confidential, provided that doing so does not prevent the use of such information when subpoenaed in judicial proceedings for prosecution of violations of the act.

Any information or research material acquired by the Board of the Department is required to be transmitted to the Continuing Education Center for Ecology Information at East Central State College, where the information is made available upon public request. The Board is also required to continue studying the feasibility and success of integrating the pollution control activities of the various state agencies, and to submit an annual report on this management issued to the Oklahoma House and Senate with any pertinent recommendations. This requirement presents a potential vehicle for a comprehensive description of state management coordinating activities around the issue of toxic substances.

The Oklahoma Pollution Control Act serves as a statutory control in all environmental media and is designed to enhance the comprehensive coordination of pollution control activities in the state as well as toxics information gathering activities.

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VIRGINIA

The Virginia Toxic Substances Information Act (TSIA) of 1979 is a broad based piece of environmental legislation primarily concerned with enabling the state to gather information on toxic substances in the state. The Act specifically authorizes and requires investigations and inspections of chemical-related industries and gathering information therefrom. This provides a comprehensive mandate for pollution control or environmental protection based on an awareness of the hazards associated with toxics in the state.

The Act's stated purpose is rather broad in scope and encompasses a number of interesting features:

> "The state Department of Health shall administer and provide a comprehensive program of preventative, curative and restorative environmental health services; to educate the citizenry in health and environmental matters; to develop and implement health resource plans; to collect and preserve vital records and health statistics and assist in research; to abate hazards and nuissances to human health and the environment, in both emergencies and otherwise, thereby improving the quality of life in the Commonwealth."

Provisions of the Act are administered by the state Board of Health, state Health Commissioner and the state Department of Health.

Another interesting facet is the act's delegation of authority to the Board of Health for issuing special orders and regulations to meet any emergency not provided for by general regulations in order to supress public health nuisances and communicable, contagious and infectious diseases. These two particular points in the Act (e.g., purpose and delegation of emergency authority) seem to provide the state with fairly extensive powers, both in regard to what activities the Board and the Department of Health can institute to control toxics and emergency orders for protecting public health.

Regarding information gathering activities, one section of the Act deals with an authorized state official's right to entry and the procedure for issuing warrants to inspect for information gathering and monitoring purposes. In order to lawfully enter another's property to inspect, the state designated inspector must have the property owner's (or custodian's) consent. If consent is denied, the Commissioner of Health or designee may apply for a warrant to inspect.

The Act specifies the type of information manufacturers are required to report to the state:

1) name and location of the commercial establishment;
2) names and estimated quantities of raw materials utilized by the establishment;
3) catalysts;
4) final products.

The Act also requires that any commercial establishment utilizing a raw material, catalyst, process solvent or final product, or manufacturing any Class I substances meeting or exceeding specific amounts specified by the Board of Health must report the following information regarding this use to the Board:

1) name of the toxic substance;

2) known or reasonably expected to be known chemical properties of toxic substance not readily available in standard reference texts;

3) appropriate means or methods of detoxification or decontamination;

4) manner and extent of toxic substance emission into the air, water and workplace or environment in general;

5) whether or not there is a foreseeable risk of danger that the substance will adversely affect sewage, other waste treatment, solid waste disposal systems and employee health due to exposure.

The Act also requires any establishment that utilizes a substance not listed as Class I, but knows or reasonably expects to know that the substance is toxic under the circumstances of its manufacture and may pose a substantial threat to human health or the environment, to report this to the Board. These report requirements also apply to any employee, agency, holder of any patent, consultant or independent contractor.

The Act has a section on confidential business information in which the Board is not allowed to release information on secret processes, patents, etc., to anyone, including the federal government, unless the agency or institution is required by law or regulation to have such information and a written request for that information is made.

Throughout all of these provisions and reporting requirements, the Act utilizes a broad definition of toxic substances. Toxics are considered to be "any substances including raw materials, intermediate products, catalysts, final products or byproducts of any manufacturing operation conducted on a commercial establishment that has the capacity through its physical, biological or chemical properties to pose a substantial risk of death or impairment, either immediately or over time, to the normal functions of humans, aquatic organisms or any animal." Thus, in defining toxic substances in terms of posing a substantial risk of death or impairment, the Act encompasses not only immediate crisis situations, but the long range chronic or cumulative effects of chemical substances.

The Act also requires an annual report on the status of toxics control in Virginia to be made to the General Assembly and the Governor. The report is a useful information tool in itself, as it includes such information as the state organizational structure for controlling toxic substances, pertinent federal statutes and agencies involved in state toxics activities, state methods for improving interagency/program coordination on toxics issues, and a general overview and annual orientation toward controlling toxic substances.

Thus, the Virginia Toxic Substances Information Act provides the state with the legal mandate for collecting toxics information, lays out the organizational structure for analyzing and acting upon the information collected, and provides an annual reporting mechanism to maintain surveillance over the general toxics control strategy.

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Innovative Programs, Projects and Studies

This portion of the report describes a variety of innovative state programs, projects and studies related to dangerous chemicals management. They include: emergency response, enforcement tactics, health effects studies, information gathering, integrated environmental planning and review, management inventories, networking activities within and among states, standards development for non-regulated chemical contaminants, testing procedures, training, and working with industry and local governments.

Some of the activities highlighted here are parts of integrated state toxics management programs, while others are discrete activities which are noteworthy as potential elements of an integrated program.

EMERGENCY RESPONSE

Iowa - Portable "spill library" for regional emergency response officials.

The Compliance Division of the Department of Environmental Quality has developed a portable library to aid emergency response personnel in identifying, controlling and abating chemical emergencies. The Division has compiled a "Spill Library" containing reference materials describing chemical properties, human and environmental impacts and procedures to contain chemical spills in the air, land and water.

The state is divided into six major emergency response regions, each with a specific emergency response plan, trained personnel and a copy of the spill library. The library is portable, and a trained emergency response official in each region is on 24 hour call with the library to respond to hazardous materials incidents.

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Kentucky - Annex Q Plan detailing response agencies and their responsibilities for varied hazardous materials emergencies.

The Kentucky Disaster Plan includes a specific section dealing with emergency response to hazardous materials incidents referred to as the Annex Q Plan. The plan provides the framework for actions to be taken when a hazardous material is released into the environment threatening injuries or deaths or property damage or degradation of the environment. Annex Q specifically addresses the cooperation and coordination of the resources and actions of the industry, local, state or federal government needed to remove the threat to public health, welfare and safety caused by a hazardous materials incident.

The plan includes sections on general disaster response organization, tasks required of local and state government according to specific agencies, a list of contacts for technical assistance according to type of emergency and hazardous material involved, and a section of the concept of operations to be carried out in the event of a hazardous materials emergency.

The concept of operations section breaks down response procedures into the following directives:

1) reports of potential or actual hazardous materials accidents are to be made to the nearest local emergency response official;

2) local officials will immediately contact the Kentucky State Police and State Fire Marshall, and should attempt where possible to determine the type of hazardous material involved;

3) local officials will, if the situation warrants, activate the local EOC, coordinate multiple service operations, request outside assistance and implement local emergency broadcasts as necessary;

4) the first state agency on the scene assumes operational control until the state agency having primary responsibility for the major threat posed by the incident reports to the scene;

5) the operating agency on the scene will contact the Disaster and Emergency Services Duty Officer if necessary, and if more than two state agencies are involved, DES is notified by the senior member of the agency exercising operational control;

6) DES coordinates all further response, including the notification of the following state agencies if not already notified:

   Fire Marshal
   Bureau of Highways
   Department of Agriculture
   Kentucky State Police
   Department for Natural Resources
      & Environmental Protection
   Division of Explosives & Blasting
   Department of Human Resources

7) the on-site Command Post is established at the vehicle of the senior Kentucky State Police Officer, and the senior member of each state agency present reports to the Command Post upon arrival at the scene and departure;

8) the State Emergency Operations Center (EOC) is kept informed of local emergencies to the maximum extent possible, and may be activated by the Executive or Assistant Director of DES or DES Directors of Operations or Response and Recovery. All state agencies involved will dispatch an authorized representative to the EOC;

9) all public information activities and releases are coordinated by the DES Coordinator at the scene, and all state agencies refer media inquiries to the DES Coordinator or to the Public Information Officer at the EOC;

10) the primary operational authority during the recovery phase of operations can be shared or transferred upon direction from the EOC or by agreement at the scene and notification to EOC. As recovery operations proceed, the nature of the threat may alter considerably, with the initial threat descreasing while one or more other major hazards remaining constant or increasing in intensity.

In addition to these detailed directives for response and recovery to a hazardous materials emergency, the Annex Q also provides important descriptions of the tasks required of local government - initiate investigation, isolate area, restoring area to normal wherever possible, evacuate persons from threatened area, and request state/federal assistance when local resources are inadequate - and tasks required of state government, with these latter tasks being broken down according to the eight state agencies mentioned in number 6 above.

The section on contacts for technical assistance includes phone numbers of state and federal agencies as well as industries with expertise in such areas as hazardous chemicals, poisons, pesticides, military chemicals, aircraft incidents, railway accidents involving explosives, and water related incidents. By providing such a highly organized method of emergency response, stressing not a particular agency as the ultimate authority but identifying specific areas of concern and expertise, Annex Q attempts to insure the orderly flow of personnel, equipment and expertise to the accident scene. The state reports a large success rate in safely controlling hazardous materials incidents since the adoption of Annex Q, and reports that a standard operating procedure that is both efficient and productive has resulted.

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Tennessee - Emergency plan categorizes five types of hazardous materials incidence, with response for each.

The Tennessee Disaster Assistance Plan also contains a specific section detailing the procedures to be followed in the event of a hazardous matierals incident. Tennessee's plan is similar to Kentucky's in that a detailed format is laid out in the plan including a concept of operations, tasks to be carried out by local and state emergency response personnel, and command and control responsibilities of each state agency responding to a hazardous materials emergency. Differences between the two plans occur in the actual response and recovery methodology employed.

Initially, the state categorizes hazardous materials incidents into the following five categories:

Category I	Major emergency; contamination and/or fire has occurred; all agencies prepare for systematic operation in excess of 24 hours.
Category II	Large spill.
Category III	Large spill; possible fire and/or contamination.
Category IV	Large spill; more than 2 kiloliters or 2500 kilograms; moderate contamination.
Category V	Small spill; less than 2 kiloliters or 2500 kilograms; minimal contamination.

Local government tasks for hazardous materials emergencies include:

- develop a local hazardous materials response plan,
- assign responsibilities for coordinating hazardous materials accidents to a local government agency,
- develop mutual aid agreements with adjacent jurisdictions,
- initiate the investigation, isolate the area and restore the area.

When a hazardous materials accident is beyond the capability of local government, the Director of the state Office of Civil Defense and Emergency Preparedness (acting for the Governor) may direct assistance from state agencies to local governments. State agencies with delegated hazardous materials emergency responsibilities include:

- Office of Civil Defense and Emergency Preparedness
- Department of Public Health
- Department of Transportation
- Public Service Commission
- Department of Labor
- Department of Agriculture
- Department of Safety
- Department of Conservation
- Tennessee Wildlife Resources Agency
- Tennessee National Guard

State government response to a hazardous materials incident is supported by the Hazardous Materials Response Force (HMRF), coordinated by the Director of Civil Defense and Emergency Preparedness. The HMRF is composed of approximately 160 trained personnel from various state agencies, each of which is issued equipment items to insure safety. In addition, the HMRF has access to any of the five MAXI-VAN trucks containing specialized equipment useful in responding to hazardous materials incidents (airpacks, respirators, toxic detection equipment).

A Hazardous Materials Response Team (HMRT) is also created in the event of a hazardous materials incident in order to match expertise with the nature of the chemical involved in the emergency. HMRT members are a cadre of personnel drawn from the HMRF. The HMRF will also be augmented by expertise from the Civilian Advisory Team. The Team, composed of specialists in hazardous substances, will make recommendations to the HMRF on procedures for neutralizing the potential harmful effects of hazardous materials.

If the situation presents a serious threat to persons and/or property, it is the responsibility of State Civil Defense to assume coordination for those problems related to individuals affected by the incident. When a major hazardous incident occurs (Category I through IV) State Civil Defense Operations will notify the Tennessee Wildlife Resources Agency, whose communications system will serve as the primary system for communication between State Civil Defense and the on-scene coordinator. In addition, Civil Defense Operations will secure and dispatch a Public Information Officer (PIO) to the scene of the incident to serve as liaison and information officer to the news media. The PIO will report and remain with the on-scene coordinator and hold hourly news conferences.

Thus, through the Hazardous Materials Response Force, Team and Civilian Advisory Team, Tennessee's plan for handling hazardous materials incidents attempts to work within a defined emergency response framework but to also approach each incident on an individual basis, directing only those individuals or equipment with specific expertise in the chemical area involved. By approaching emergency response in this manner, the state is better able to utilize its personnel and resources in the most effective and efficient manner.

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ENFORCEMENT

New Jersey - Interagency enforcement strike force for hazardous wastes.

New Jersey's Interagency Hazardous Waste Strike Force is a creative response to the complex problems associated with controlling illegal toxic waste disposal. The Strike Force is comprised of representatives of:

1) New Jersey Department of Law and Public Safety (Divisions of Criminal Justice, Law and State Police),
2) New Jersey Department of Environmental Protection,
3) U. S. Environmental Protection Agency,
4) U.S. Attorney's Office of the District of New Jersey.

It was created in July 1979 by executive order and funded by the U.S. EPA primarily as a result of state recognition that the various state and federal agencies responsible for controlling toxic waste disposal needed a coordinated framework within which to function.

New Jersey's Department of Law and Public Safety Division of Criminal Justice became involved in investigating and prosecuting illegal waste disposal cases in 1976 when Newark police and fire personnel discovered drums of toxic waste dumped under an elevated highway in the city posing an immediate threat to the public health and safety. With no specific statute allowing for criminal prosecution of such activity then existing, the Division in conjunction with the Department of Environmental Protection (DEP) began working to investigate the incident and determine whether a viable method of criminal prosecution could be developed.

DEP and the Division concentrated most of their initial investigative efforts on gathering information on toxic waste haulers, excluding licensed waste facilities, believing that illegal dumping incidents resulted primarily from the 1976 closing of the state's two largest landfills accepting toxic waste. These investigations showed the potential for enormous profits through illegal disposal, especially with New Jersey housing large numbers of hazardous waste generators as well as receiving a large amount of out-of-state waste. The illegal disposal problem was, however, viewed as one of temporary duration, projected to abate as more legal disposal facilities became operational.

In 1978, the Division of Criminal Justice created the first full-time criminal investigative unit for toxic waste disposal incidents as a result of the realization that licensed recycling facilities were engaged in illegal disposal practices on an even larger scale than the hauling industry. The Toxic Waste Investigation Prosecution Unit consisted of one attorney and three investigators focusing on the recycling and waste reduction industry, and two intelligence analysts concentrating on white collar crime exposure.

This Prosecution Unit was expanded by the 1979 executive order creating the Interagency Hazardous Waste Strike Force, the expansion reflecting the need to actively involve the numerous other state and federal agencies involved in toxic waste disposal problems. The make-up of the investigative unit includes:

1) 4 attorneys (1 from Division of Criminal Justice, 2 from Division of Law and 1 from the U.S. Attorney' Office)

2) 8 investigative staff

3) 2 state police personnel

4) 2 forensic scientists

5) 4 secretaries

6) 1 bookkeeper

including investigators with accounting skills to trace complex financial activities of disposal businesses, and environmental specialists to conduct identification and analysis of chemical samples and surveillance and photographic experts.

The Strike Force holds regular meetings to exchange information and assure that each agency is operating with essentially the same perception of the facts of an investigation, and that all agency priorities are consistent with one another. Remedies are selected from a full range - criminal, civil and administrative - tailoring relief activities to the specific nature of a toxic disposal problem examined by the Strike Force. Since 1977, tweleve individuals and seven corporations have been convicted at trial or pleaded guilty to charges as a result of a Strike Force investigation and prosecution.

Within the Strike Force, the Division of Criminal Justice works closely with DEP in the following ways:

1) formulating proposals for legislative and administrative responses,

2) institution and prosecution of civil actions,

3) choosing various administrative actions.

At the present time, a plan is being implemented to intensify the state's efforts to remove organized crime from the garbage industry and to conduct criminal investigations of organized crime in the toxic waste disposal industry on the basis of leads already developed in solid waste investigations. In addition, an experienced intelligence officer has been assigned to work with the Strike Force to oversee the gathering and analysis of additional intelligence information, and provide a plan of action to control organized crime's role in toxic waste disposal.

This expansion of the Strike Force is projected to lead to:

1) more extensive intelligence gathering capacity,
2) higher quality information,
3) a greater understanding of the role organized crime plays in the toxic waste disposal industry.

The Strike Force is not viewed as an independent entity. The intent of the Strike Force is to serve as "a bridge connecting the various agencies with authority, responsibility, greatest resources and legislative responsibility to act to control the toxic waste industry in a way that provides for better coordination among these agencies and maximizes their individual effectiveness and efficiency."

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Massachusetts - Hazardous Waste Strike Force.

One of the only other state-operated interagency hazardous waste strike forces discovered in our research is the Massachusetts Hazardous Waste Strike Force. Following much the same format as the New Jersey Strike Force, Massachusetts' activities and focus include:

1) review of potential criminal cases;
2) coordinated state investigations;
3) train law officials, lawyers and Department of Environmental Quality Engineering (DEQE) technical personnel in effective hazardous waste enforcement;
4) coordination between Massachusetts and other states to investigate suspected waste dumping operations;
5) increasing surveillance of suspected "gypsy haulers" or "midnight dumpers;"
6) impounding suspected hazardous waste cargoes.

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HEALTH EFFECTS STUDIES

Illinois

The Environmental Toxicology Program in Illinois' Department of Public Health is currently attempting to expand its existing informal surveillance program to include additional investigations of acute exposure and more long term health effects studies. Some of the health effects studies conducted to date involving epidemiological work and human and environmental sampling include:

1) a study of approximately 360 households in which the chemical Lindane had been used for over twenty years to test for potential adverse health effects, conducted in cooperation with U.S. EPA and the University of Iowa;

2) a community assessment in central Illinois to identify health effects resulting from exposure to selected chemicals, especially an organophosphate compound emitted during a recent major fire in northern Illinois; and

3) short term studies of formaldehyde exposure, pesticide contamination, heavy metal poisoning and other activities in response to inquiries concerning unknown substances producing adverse health effects.

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Montana

Montana is currently finalizing its report on a major state-funded air quality/health effects study carried out by the Air Quality Bureau. The purpose of the study is to determine how air pollution affects the health of residents in several specific areas in Montana known to have significant air pollution problems. Health effects studies being conducted include:

1) pulmonary function testing of school children and persons with respiratory diseases;

2) screening for the presence of carcinogenic substances in children's urine;

3) clinical and hospital admissions data studies as related to air pollution episodes; and

4) death certificate analysis to determine numbers of deaths possibly related to air pollution from 1970 to 1975.

The scope of this project, encompassing health effects related to air pollution in general as opposed to a particular air contaminant, makes this a particularly significant study with a broad potential application for other states and regions as well.

Additionally, the state is currently involved in several selected projects examining the health and environmental impacts of pesticides in the state, including:

1) an in-depth study of the effects of the production of 2,4,-D as a result of claims by citizens in western Montana that the pesticide's production pollutes the environment to the extent of causing miscarriages. The state is collecting air, water, soil and food samples as well as health effects data in an effort to determine whether 2,4,-D production can be linked to miscarriages; and

2) a study of spray drift and its health effects on residential and urban areas.

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New Jersey

The state has recently conducted a variety of case studies of toxic substances health-related problems, involving:

1) lead contamination in Elizabeth, New Jersey whereby the state Department of Health became aware of a possible lead poison problem in 1976, with the Program on Environmental Cancer and Toxic Substances (PECTS) leading the investigation;

2) a fire and explosion at the Rollins Environmental Services waste treatment plant in 1977 prompting a study whose primary concern was whether the toxicity and quantity of the chemicals involved would necessitate evacuation of the area;

3) a study involving a leukemia cluster in Rutherford, New Jersey where, in 1978, five children in one school contracted leukemia. Environmental monitoring keyed upon identification and measurement of benzene and ionizing radiation, and the Department of Health conducted a careful epidemiological study to confirm the first cancer reports. While the investigation found no explanation of the cases of cancer observed, the study is seen as a unique example of how a wide range of environmental health information can be combined and studied in relation to a disease outbreak; and

4) a study involving worker exposure to PBBs in the manufacturing process at New Jersey's two PBB plants. The state PECTS program coordinated the case studies and participated in the planning and implementation of a health surveillance study to determine whether workers at these two plants had been adversely affected by their exposure to PBBs.

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New York

The state has been examing health effects data such as cancer mortality rates, and has conducted epidemiological work as well; age adjusted cancer mortality figures provided by the U.S. Cancer Mortality by County Study from 1950 to 1967 have been examined, for example. In another particular case, the state conducted an epidemiological study in the vicinity of Love Canal in Niagara County which showed the rate of miscarriages and birth defects were higher for pregnancies occurring on the Love Canal, particularly with women living on the Southern Canal section.

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Vermont

The state air pollution control program is currently conducting a study of the contamination of the air relative to the use of woodburning stoves. Initial sampling and monitoring activity has identified 100 air contaminants produced as a result of woodstove use, with 25% of these contaminants being suspected carcinogens. Further in depth analysis of the data collected, as well as on-going sampling and monitoring activities, continue to be conducted in a selected residential area of Vermont, with more data and testing required to determine actual human health impacts of woodstove use.

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Wisconsin

In conjunction with the Commonwealth of Massachusetts and the U.S. Center for Disease Control, Wisconsin's Department of Health and Social Services is conducting an epidemiologic and clinical evaluation of illnesses reported to be caused by home exposure to formaldehyde fumes released from urea-formaldehyde (UF) foam insulation. Wisconsin is directing its study at mobile homes within the state with UF foam insulation, while Massachusetts is examining conventional homes.

Toxicologically, formaldehyde can act as a primary irritant of the upper and lower respiratory tract, eyes and skin and also as a sensitizing agent inducing an allergic response. Acting as an allergen, formaldehyde can induce both contact dermititis and asthma.

The question has arisen as to whether or not formaldehyde is a potential mutagen, teratogen or carcinogen. Formaldehyde has been shown in vitro to be capable of reacting with DNA to induce DNA-protein cross links, with chromosome abnormalities and an increased mutation rate observed in fruitflies exposed to formaldehyde. No evidence indicating carcinogenicity, however, has been found.

Urea formaldehyde foams have been used increasingly as insulating materials in the U.S. as a result primarily of fuel shortages and the need to conserve on home heating fuels. The toxicity of UF foam is caused by the liberation of gas (consisting principally of formaldehye) from the foam, which may occur either during the foam installation process or from the installed foam. The factors apparently influencing the release of formaldehyde include:

1) excessive amounts of formaldehyde in the resin concentrate;
2) excessive amounts of acid catalyst;
3) excessive foaming agency;
4) foam installation during a period of high humidity or temperature;
5) foaming with cold chemicals;
6) improper use of vapor barriers; and
7) improper use of foams (ceiling, floors)

Numerous reports of toxicity caused by formaldehyde gas exposure from UF foam have been reported to state health and consumer protection officials in a number of states.

The three major questions to be addressed in Wisconsin's study are:

1) What is the incidence of illness in residents of houses insulated with UF foam?
2) What is the severity of these health problems?
3) What is the relationship (dose-response) between frequency and severity of illness and degree of exposure to formaldehyde?

The study's methodology focuses primarily on interviewing selected families from a sampling of the identified exposed population, with information collected including data on such topics as:

1) *demographics*

2) *home*

3) *UF foam insulation*

4) *other potential sources* of formaldehyde in or near the home

5) *formaldehyde odor*

6) formaldehyde-related *symptoms*

7) other *medical data*

8) brief *occupational history*

Persons found to have formaldehyde-related health symptoms are given additional tests including pulminary functioning and allergic/dematologic evaluation for formaldehyde allergy.

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INFORMATION GATHERING

Iowa - Chemical survey of public schools and laboratory safety training course and manual.

The Iowa Department of Public Instruction has conducted a survey of all state junior and senior high schools in an effort to determine the quantity and types of dangerous chemicals stored in school science laboratories in the state. Out of several hundred chemicals and chemical compounds surveyed for initially, between 58 and 60 types of potentially dangerous chemicals were found in state schools. As a result, the Department, in conjunction with the Iowa Science Safety Task Force and the National Science Foundation, has developed a manual and chemical safety training course for all state science instructors in Iowa's 15 area education districts. The manual addresses such issues as:

1) legal liability - state, school legal obligation to protect students, case studies of negligence in the classroom;
2) safety in biology, chemistry and physics settings;
3) eye protection and care in science laboratories;
4) science safety for handicapped students;
5) accident/incident reporting systems.

In addition, the manual includes checklists to be utilized by science instructors to determine if the proper safety procedures have been followed.

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Michigan

Michigan's Critical Materials Register (CMR), an extensive computerized information system operated by the Michigan Department of Natural Resources' Office of Toxic Materials Control, is involved in the identification and prioritizing of toxic chemicals present in the state's environment with the potential for causing serious harm to humans and the environment. The CMR was authorized in a 1972 amendment to the Michigan Water Pollution Control Act, and by 1978 the state had developed a model for evaluating chemicals for possible inclusion in the CMR based on a numerically scored hazard assesment.

In selecting chemicals for review, the committee focuses on chemicals recognized as highly toxic (PCBs, mercury, cyanide) and those already on EPA lists of hazardous substances and priority pollutants, OSHA standards for carcinogens and a list of substances of concern developed by New York's Department of Environmental Conservation. After selection, each chemical undergoes an evaluation beginning with literature searches on the physical, chemical and toxicological properties. These searches include obtaining the chemical abstract number, utilizing various libraries in the state, and pesticide references. The evaluation is then reviewed for accuracy, reference and toxicity data.

The next step involves a hazard assessment process - a priority ranking system based on the assignment of points to each chemical/mixture according to seven specific factors:

1) acute toxicity

2) carcinogenicity

3) hereditary mutagenicity

4) teratogenicity

5) persitence

6) bioaccumulation

7) other adverse effects, including subacute and chronic effects, phototoxicity and asthetic damage

These seven factors are further broken out into categories which are assigned a point value commensurate with the magnitude of environmental impact; for example, categories under the first factor of acute toxicity span the spectrum from extremely toxic, to highly toxic, moderately toxic, slightly toxic and relative non-toxic, with an asterisk assigned where insufficient information is available to make a determination. Top priority (for further information gathering and possible monitoring and investigation) is assigned to those companies utilizing chemicals/mixtures with the most asterisks. Reporting requirements mandate that every business within the state utilizing a substance listed on the register and discharging waste water must file an annual report on the critical materials used or discharged.

The critical levels (or numberical scores for each category) have been assigned based on the available literature, with references provided showing exactly where and how the particular critical level was determined. The Office of Toxic Materials Control maintains the complete chemical evaluations with data on the chemical, physical and toxicological properties of each critical material. This information could be ultimately useful to other states interested in developing a similar register. It provides such information as the office references most often used for chemical evaluations and a hazard assessment sheet indicating which literature search information is used to determine the seven factors and corresponding categories and numerical scores.

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Virginia - State Toxics Inventory and Public Information Tools.

The Virginia Department of Health currently conducts a geographical inventory of state manufacturing establishments using chemical substances as raw materials, catalysts, process solvents or final products. All manufacturers regardless of size must report to the department including shipyards, farm cooperatives, machine shops, printers, asphalt and concrete batchers, furniture, animal food and cigarette manufacturers, distilleries and electrical power generators. Mixtures are reportable, and some out-of-state manufacturers have voluntarily reported ingredients of their tradename products.

In addition, toxicological data are retrieved and evaluated in response to specific requests of state agencies, local governments, media and the public. This provides a central resource for these organizations where further information may be obtained as quickly and efficiently as possible. The range of requests is broad, and has included use of asbestos-concrete pipe for drinking water, habitability of residences after contamination, effects of spilled chemicals on humans, land, animals and aquatic life, acute and chronic effects from work-related exposures, use of highly toxic substances in school science laboratories, art classes and vocational shops as well as analytical techniques and methods of decontamination.

Similar evaluations are made and disseminated widely to individuals affected by newly-reported toxic effects, on subjects of current and/or popular concern and when widespread misuse of chemicals is apparent. The Health

Hazard Alert, put out by the state Department of Health, has covered such topics as acrylonitrile, asbestos, potential hazards of mercury vapor and metal halide lamps, urea-formaldehyde foam insulation and pentachlorophenol-treated lumber for homes.

In addition, the Department provides the following written materials upon request:

1) Virginia Toxic Substances Information Act
2) Rules & Regulations for the Reporting of Chemical Substances Manufactured or Used in Manufacturing
3) Toxic Substances Advisory Council tentative agenda
4) Health Hazard Alerts
5) newsletters

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Mississippi - University Toxicology Department's Chemical Information Center.

The Mississippi University Medical Center operates a Department of Toxicology. This department has responsibility for maintaining a biography of all toxic substances manufactured, sold and used in Mississippi and a record of the toxic substances, their chemical and physical make-up, their effects on humans and the recommended treatment in cases of improper use, exposure, etc..

The department has no regulatory authority for collecting industry information on generation, use, but the department's information is utilized by state agency personnel and its services are available to all citizens and institutions on a 24 hour basis. In addition, the department has a continuing research program to identify new treatments for toxic exposure.

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INTEGRATED ENVIRONMENTAL PLANNING AND REVIEW

Iowa - Example of intra-agency planning when a division is in the process of rule making or revision.

Intra-agency dangerous chemical management functions are coordinated in the Department of Environmental Quality (DEQ) through a formal planning process. This involves convening all sections of DEQ affected by one section's development or revision of rules. All the affected sections then work together to clarify responsibilities and coordinate or revise any new management activities, thus eliminating the possiblity of duplicating management functions. This process also increases awareness of the activities and responsibilities of the separate sections within the agency and enhances continuing collaboration.

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Kansas - Intra-agency study group system wherein various divisions examine specific environmental problems and develop integrated work plans to investigate and abate problems.

Within the Department of Health and Environment, the Divisions of Environmental Sanitation (managing hazardous waste), Water Quality, Air Quality and Occupational Health have established a Study Group System to assess and recommend operational options. In the past year, study groups have been organized to examine the overall community impact of both hazardous wastes and private chemical industries in the state. These study groups operate by appointing a coordinator from among the divisions represented. The coordinator then organizes joint testing procedures, analyses, surveys and inventories of both the affected population and environment. A final technical report is then published assessing problems and making recommendations for solutions where possible. Thus, even though the process is carried out only within the Department of Health and Environment, it does signify an effort to consolidate toxics control management functions from the initial stages of determining the problem to be addressed, to developing recommendations for solutions.

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Utah - Interagency pre-design conference of agency heads and industry to integrate decisions about plant location or expansion.

Whenever a new industry involved in the production, use, storage or disposal of dangerous chemicals attempts to locate in Utah, or an existing industry plans to expand its operations, an interagency pre-design conference is convened by state. At this pre-design conference, the heads of all state agencies affected by the new or expanding industry with the industry's representatives to review regulations, licenses and permits to be fulfilled before operations may begin. This is an unusual attempt to consolidate the permitting and general regulatory processes for industry on a pre-operations, interagency level. Not only does the pre-design conference help to alleviate or reduce time consuming regulatory procedures for both state government and industry, but it may also promote state agency-industry relations.

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MANAGEMENT INVENTORIES

North Carolina - State agency directory of toxics-related responsibilities and activities.

An interesting and innovative aspect of North Carolina's toxics integration strategy involves an inventory of all state agencies and their activities carried out to control the detrimental effects of toxics on human health and the environment. The inventory takes the form of a descriptive directory of state government forces involved in environmental management. The Department of Natural Resources and Community Development and the Department of Human Resources are the major components. Eight additional state agencies and the state budget office are also included, with information received through staff interviews and agency-supplied materials. Volume Two of Environmental Management in North Carolina was recently published in August of 1980 out of the governor's office.

The directory reflects North Carolina's commitment to a comprehensive environmental management strategy which necessarily incorporates a wide range of institutions and activities at the local, state, regional and federal levels. The directory encompasses not only all these institutional levels but all management functions (evaluation, monitoring and regulation), all forms of environmental damage (chemical, biological and asthetic) and all environmental media (air, land, water, workplace, consumer protection as well as economic development).

The inventory serves as a comprehensive model directory for state government personnel attempting to avoid program duplication and to foster cooperative consolidated program activity in regard to toxic substances control. Included in the directory are organizational graphs. agency/program budgets and concise descriptions of all program activities related to environmental management. The inventory may well serve as a useful public information tool, allowing citizens (as well as private industry) to easily locate the appropriate department or program with jurisdiction in their area of interest.

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Virginia - State toxic substances annual report serving as a useful organizational tool.

Virginia's Toxic Substances Information Act includes a provision requiring that an annual report on the status of toxic substances control in the state be made to the General Assembly and the Governor. Virginia's Annual Report is especially interesting in the scope of the reports to date.

The report, for example, has an interesting section on federal activities and an outline of the various federal statutes, corresponding agencies responsible for implementation, the date of the Act and amendments as well as the medium, product and operation covered by the Act or regulations.

In addition, the Act also details the state's organizational structure for implementing the toxics control strategy. Specifically, the twelve Virginia agencies and the four Cabinet Secretaries coordinating those agencies and their activities are described. A descriptive table correlating all the agencies with the medium, operations and products they regulate is provided.

The concept of interagency coordination is examined, indicating that some coordination is mandated by statute, while memberships on multi-agency groups such as the Virginia Council on the Environment and the Toxic Substances Advisory Council tend to foster awareness and provide increased opportunities for coordination. In addition, specific program area information is provided along with an analysis of the state of the specific program in relation to the state goal of integrated toxics management.

Appendix A provides one of the most interesting management tools of the entire report. On the first page of the appendix is a program summary sheet with the left-hand column listing the major agencies (and subagencies), and the right-hand column indicating the page within the report where the agency's description is located. These agency/program descriptions include information on:

1) regulated products, operations or mediums,
2) responsible agency,
3) Code of Virginia reference,
4) relevant Virginia rules and regulations,
5) related federal statutes,
6) program identification - budget codes, source of funds, contacts, and supporting activities,
7) control strategies,
8) legal remedies,
9) status - reports, current status and major future plans.

Thus, Virginia's Toxic Substances Annual Report serves as a useful organizational tool for state agency personnel involved in toxic substances control by providing a comprehensive, descriptive analysis of all state programs involved in the implementation of the state toxics strategy. By providing descriptions of program activities and agency responsibilities, the report helps agency personnel to quickly identify appropriate programs or individuals for their needs. In addition, the report should also serve as a general educational tool for state officials by indicating the other state agencies or programs involved, responsible for or active in similar areas of toxic control.

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NETWORKING

Wisconsin - Disposal surveillance program.

The Wisconsin Department of Natural Resources (DNR) has launched a two pronged "Wisconsin is Watching" program to step us surveillance and prevent the illegal, night-time disposal (or "midnight dumping") of hazardous wastes in the state. Numerous reports of illegal dumping in other states and the increased awareness of the dangers of illegal dumping prior to November 1980 when federal disposal regulations took effect, prompted the DNR to develop a state-wide surveillance program. It continues to operate even though federal manifest requirements have gone into effect.

The effort involves both increased surveillance by law enforcement agencies and a state-wide citizens alert stressing the need to report suspicious activities. The "Wisconsin is Watching" program attempts to develop a communications network among a broad based group of agencies including:

- DNR wardens
- State and highway patrols
- County sheriffs
- Local fire and police departments
- Fish and wildlife managers
- University of Wisconsin extension agents
- Forest administrators
- County emergency preparedness offices
- Division of Emergency Government

All these groups have received a "Wisconsin is Watching" information and operations packet. It describes what to look for and what to do about it.

General information identifies hazardous wastes, their characteristics and possible industrial sources. A more specific listing of potential indicators of hazardous waste dumping and suspicious activities is provided. Potential indicators include:

1) distinctive odors
2) "out of place" materials at disposal sites (chemical barrels mixed with normal household refuse)
3) dead fish or wildlife
4) large tire tracks leading into secluded areas
5) unkempt industrial yards (greasey dirt, discolorations, leaking barrels)
6) wash marks on roadsides left by tank truck discharges

Suspicious activities include:

1) barrels dumped in wetlands, along roadsides or in isolated locations
2) dumping activities at other than licensed waste disposal sites
3) town landfills with unattended gates
4) large trucks off known truck routes
5) industrial vehicles unloading in secluded areas or in the vicinity of abandoned property
6) tanker trucks discharging liquids into manholes, sewers, streams, along roadways
7) trucks on the roadside late at night unloading cargo in unlikely locations
8) moving trucks spilling liquid onto roadways

The packet describes three dumping situations and procedures for each group involved in the program. The first situation involves suspicious activity observed, but no dumping yet occurred. Useful information for the State Patrol and County Sheriff includes:

- when and if to stop a suspected vehicle
- legal authority to stop and search
- possible remedial actions to be taken if violations are found

All others are advised to:

- record vehicle description, location and suspicious activity
- notify state patrol and county sheriff

The second situation involves observation of illegal dumping in progress. State Patrol, local police, county sheriffs and conservation wardens are instructed to:

- apprehend the individual and seize the vehicle (statutory authority to do so is detailed)
- keep precise record of all incident information
- contact the Division of Emergency Government (who alerts DNR's Spill Response Team)
- take preliminary action (isolate spill area, detour traffic, wear protective equipment)

County foresters, Extension service agents and other personnel are instructed to:

- contact the Division of Emergency Government (collect if necessary)
- remain on the scene until law enforcement officials arrive

- record vehicle type, license, location and dumping incident

DNR pilots should:

- contact the Conservation Warden who will contact DEG
- maintain surveillance if possible

The final situation concerns the discovery of a site where illegal dumping of hazardous wastes may have already occurred. State patrol, local police, county sheriffs and conservation wardens should:

- contact DEG
- take preliminary action - keep public away from the area, detour traffic, wear protective equipment and maintain in-field conditions

County foresters, extension agents and others should contact DEG, and DNR pilots should contact the DNR warden who will contact DEG.

The information packet also provides organizational charts indicating response methods for dumping in progress and dumping already occurred, correct copies of a state manifest, a truck placarding chart and state laws delegating enforcement and response duties.

The "Wisconsin is Watching" program has also made a strong attempt to include the general public in its surveillance activities. The governor has recorded a public service television announcement encouraging all citizens to watch out for illegal dumping activities, indicating what activities should be considered suspicious, what is evidence of a possible illegal dump and how and who to contact.

As a result, the surveillance program incorporates and coordinates all levels of the government and the citizenry in an effort to prevent, abate and quickly respond to illegal chemical dumping activities. While much of the information provided by the program is probably known and used in many other state emergency response agencies, the presentation of the information in a single packet and the attempt to spread the information across all levels of state government and the public sector indicates an effort to consolidate emergency activity and increase its effectiveness.

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Wyoming - Occupational Health and Safety Planning Association - interstate planning council.

In January, 1979, the Occupational Health and Safety Planning Association, a group comprised of the 22 states and 2 territories currently operating state occupational programs, convened in Wyoming to examine the major problems faced in the worker health and safety area, and the means to improve worker protection programs.

A general statement of purpose was drafted, and an attempt is currently underway to involve more states and territories in the program. Activity is presently focused on meeting with governors of states which do not administer the federal worker health and safety program but border on the member states, in order to encourage state initiation of such programs.

The Wyoming Department of Health and Safety's Occupational Health and Safety Division has taken a lead role in this nation-wide networking program to promote state operation of the federal occupational health and safety program.

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STANDARDS DEVELOPMENT

Kentucky and Vermont - Federal exposure limitation applied to non-federally regulated air contaminants.

The federal Occupational Safety and Health Administration (OSHA) has developed Threshhold Limit Values (TLVs) to protect worker health. Both Kentucky and Vermont state clean air programs have voluntarily adopted TLVs as a means of assigning emissions limitations to potentially hazardous air particulates not covered by federal air pollution control standards. TLV is the necessary recovery time (or threshhold limit) for workers exposed to hazardous substances in the workplace.

In Kentucky, the Air Pollution Control Board converts this use limitation for specific chemicals into an ambient air standard where the federal government has not specified an emission limitation.

In Vermont, the same methodology is utilized, whereby environmental exposures determined to exceed 10% of the TLV for that particulate are targeted for detailed investigation. An industry emitting particulates in excess of 10% of the respective TLV must adequately prove that the emission presents no danger to the environment or public health. The state, based upon its investigation and the industry's documentation, regulates the air emissions accordingly.

The integration of already well defined and investigated impact data from one media (here the workplace) into the rules and standards development of another (in this case, air) exhibits an effective means of consolidating chemical information collecting activities to achieve not only the protection of the worker but the general population and the environment as well.

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TESTING PROCEDURES

New Jersey - Use of AMES test to screen substances needing additional analysis.

New Jersey's Program on Environmental Cancer and Toxic Substances (PECTS) is demonstrating the utility of invitro biological testing procedures. PECTS has emphasized developing short term invitro tests that are capable of determining the presence of a wide range of chemical contaminants in a variety of biologic samples (water, sediments, fish and fauna).

The PECTS program has several objectives in using these invitro testing procedures (also referred to specifically as the Ames Test):

1) to identify geographic areas in the state that contain significant levels of mutagenics and carcinogenics;

2) to demonstrate the utility of such tests for targeting environmental media for sampling and further in-depth chemical analysis;

3) to demonstrate the feasibility of using such tests as regulatory or enforcement tools; and

4) to demonstrate the feasibility of using invitro tests as surrogates to more in depth chemical tests in monitoring for compliance.

Invitro tests are important because synergistic effects can be observed or discovered only in biologic samples, which may contain numerous chemical elements. In a chemical mixture, for example, only one element may be a carcinogen, but other elements present may intensify the carcinogenic effect. In addition, the mixture may be of two or more extremely weak carcinogens which, when combined, may result in a greatly enhanced carcinogenic effect.

Thus, biological tests such as the Ames Test have an inherently greater ability to detect such interactions and variations than the lengthy, more frequently used method of testing individually for those chemicals posing the highest risk to humans or the environment.

Another advantage to invitro testing is that short term biologic tests are less expensive to perform than the more detailed specific chemical analyses. For example, the Ames invitro mutation assay of an air sample costs approximately $85, while a comprehensive chemical analysis of the same air sample costs as least $1,000 (as the sample must be tested for each potential dangerous chemical separately). The more expensive chemical analyses, then, can be selectively used for specific determinations after an invitro scan shows that potential problems actually exist. This contributes to a more efficient and cost saving monitoring program.

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TRAINING

Colorado - National hazardous materials training institute for government officials and industry.

The Colorado Training Institute (CTI) located in Denver, Colorado is the first professional school in the country totally devoted to promoting hazardous materials safety through education and training. The school is funded by the U.S. Department of Transportation through the Colorado Division of Highway Safety, with three full-time employees from the Denver Police Department, and the Colorado State Police and the Division of Highway Safety operating the overall program. Instructors are representatives of major national companies and agencies involved in chemical transport, packaging, storage, etc., who volunteer their time with the assistance of the organizations they represent. Some of the companies and agencies involved include: Phillips Petroleum, Liquid Air, Amerigas, Dow Chemical, Frontier Airlines, the U.S. Coast Guard and the Colorado Agriculture Department.

CTI is the culmination of nearly a decade of research, course development and vulunteer participation by representatives from federal, state and local government and private industry, working together through the Colorado Committee on Hazardous Materials Safety. The Committee was formed in 1973 when the Denver Police Department organized a meeting of representatives from federal, state and local governments and private industry to address the issue of hazardous materials safety. The lack of training among emergency response personnel at the scene of a hazardous materials incident was the major focus to the meeting, and a research subcommittee was formed which ultimately developed a unique, professional training program and recruited a staff of instructors with nation-wide expertise.

By 1975, CTI trained 1,375 individuals through seminars conducted around the state. In the same year, the Committee sponsored a national seminar in Denver, with representatives from 41 states and Canada participating. As a result, several states went on to develop training programs in their states for state and local emergency response personnel.

The committee was officially recognized in April 1976 when the governor of Colorado directed all state departments and agencies by executive order to cooperate to the fullest extent possible in achieving the committee's objectives. These include:

- to provide instructions on the safe handling of hazardous materials to minimize the risk of injury and property damage during the control and cleanup of an unintentional release of materials into the environment;
- to formulate, develop and present a program of instruction on the recognition of potential danger involved with hazardous materials during the normal course of transportation and storage; and
- to support the establishment of regulations, controls, and procedures designed to ensure the safe transportation and storage of hazardous materials.

CTI conducts a variety of seminars. A three-day hazardous materials workshop is offered for individuals responsible for community safety in the event of a hazardous materials incident -- fire officials, law enforcement officers, civil defense personnel and ambulance crews. It includes a comprehensive overview of hazardous materials with techniques for identification, labeling, shipping papers, first aid, containment and control, and it examines specific classes of materials such as radioactive, pesticides, industrial chemicals, compressed gas and explosives.

Another two-week hazardous materials seminar is conducted by twenty-seven experts from around the country, and is geared toward management and supervisory personnel who have attended the three-day session. This comprehensive course expands on the topics addressed in the three-day course, emphasizing planning and coordination management.

CTI offers a five-day seminar for shippers and carriers designed for dispatchers, safety directors, dock foremen, billing clerks or anyone directly responsible for ensuring that hazardous materials are ready for shipping. The course attempts to address the common complaint voiced by shipping personnel that many training courses are conducted too quickly to allow for comprehension of the vast amount of material involved. Extensive time is devoted to examining the U.S. Department of Transportation's Code of Federal Regulations, the proper preparation of shipping papers (with special emphasis on the complicated regulations for radioactive material) and proper material labelling and classification.

CTI also conducts a five-day cargo tank inspection course covering every aspect of cargo tanks, including safety features and appropriate emergency action. Aimed at chemical manufacturers and shippers, the seminar stresses preventative maintenance.

Another four-day commercial vehicle inspection seminar is designed both to assist law enforcement agencies in enforcing regulations and to instruct industry on the proper compliance of commercial vehicle laws.

The proper management of hazardous materials is viewed not only from the perspective of containment and clean up of a spill or emergency, but also as the proper labelling, classification, handling and transporting of these materials. In addition, all levels of the public and private sector are involved in the CTI program - from industries manufacturing hazardous materials and their containers, to shippers and carriers of these materials as well as state and local emergency response personnel. With the high level of private industry involvement, both at the instructional as well as participatory end, the Institute offers a viable means of controlling toxics incidents at the beginning of the chemical life-cycle through education and training.

While the Colorado Training Institute's curriculum has a definite transportation emergency orientation, it addresses the safe management of hazardous materials comprehensively, through the life-cycle of the material. Its broad based curriculum is thus important to the development of integrated toxics management strategies as are the large number of participants from both the public and private sector and the high level of involvement in the program by private chemical-related industries.

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WORKING WITH INDUSTRY

Montana - State and industry cooperation in reducing and controlling pesticides.

Beyond the basic pesticide program required by the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), Montana has several specific projects aimed at fostering cooperation between the state agriculture industry and the state Department of Agriculture. This cooperative effort includes:

1) the establishment of several Integrated Pest Management (IPM) programs aimed at reducing pesticide misuse in specific cropping systems and training agricultural pesticide users in the best management practices for controlling pests, at the same time protecting the health and environment. IPM programs are provided for under FIFRA, and involve working with industry to develop and implement the most effective/efficient procedures for applying pesticides, controlling pest infestation and protecting the health and environment in the area of application.

2) working with those applicators who mix pesticides prior to application, to reduce the number of applications necessary and, thus, the cost to applicators, as well as increasing the applicators' awareness of the potential negative impacts on the environment caused by over mixing and unnecessary applications.

In addition, the state has established a network of area test plots to provide baseline information on the environmental effects of pesticides. The test plots provide soil and air samples for analysis that can be modified and controlled to produce specific data for impact analysis. Provisions also exist for special training of state pesticide enforcement personnel at Fort Collins, Colorado, in methods of collecting health effects data and working with health authorities and epidemiologists to increase their awareness of potential human health effects related to the production and use of pesticides.

Montana employs extensive laboratory facilities and experimental chemists to provide analytical capability needed for in-depth studies and it registers 3051 pesticides prior to use in the state, licenses retail dealers and applicators, and regulates the sale of pesticides at the retail level. Through direct and frequent communication and the acknowledgement of mutual needs and responsibilities, the Department of Agriculture has developed a strong working relationship with the state pesticide and agriculture community.

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WORKING WITH LOCAL GOVERNMENTS

Massachusetts - coordination and instruction for local hazardous waste monitoring activities.

The Department of Environmental Quality Engineering (DEQE) is working on a plan for informing community health officials, firefighters and police officers about the hazardous waste problem in the state and to encourage their participation in addressing it. In addition, DEQE is developing regional programs to provide technical assistance and guidance to communities through its regional hazardous waste coordinators. In 1980, DEQE officials had a state-wide training session on hazardous waste enforcement with over 500 community officials in attendance to work out this strategy.

DEQE suggests the following steps that communities can take on their own to begin to assess and address possible hazardous waste problems. First the state's local Boards of Health are encouraged to help their communities develop a local hazardous waste program. Possible tactics include first identifying local resources such as:

1) the Fire Department, which issues licenses for storing flammables and responds to hazardous materials spills,

2) Police Department with the authority to patrol the community and arrest violators,

3) Board of Health with broad powers for protecting the public health,

4) Department of Public Works or town engineer with locations of sewers, drains, etc.,

5) conservation commission with knowledge of wetlands and other natural resources in the community,

6) Industrial Development Commission, Planning Agency or Chamber of Commerce with knowledge of community industries,

7) Water Department Superintendant with knowledge of ground water sources and drinking water recharge zones, etc., in the community, and

8) concerned citizens with specific hazardous waste related knowledge or experience.

Second, local efforts need to be organized and coordinated along with local resources. The state has appointed four hazardous waste coordinators who communicate with the local coordinator, but efforts should be made to coordinate local officials, concerned citizens and business leaders.

Next, areas for immediate involvement are outlined, and need for development of a local hazardous waste management plan is emphasized. Suggestions include identifying:

1) all the hazardous materials in the community by categories, classes, volumes, locations and type/age of containment and looking into hospitals, dry cleaners, research labs, etc. as other possible hazardous waste generating sources,

2) what goes on at the community landfill,

3) old, abandoned dump sites by checking maps, photographs, talking to older community residents, etc.,

4) transportation routes for hazardous materials,

5) map out local water supplies,

6) underground gasoline storage tanks and test for leakage.

Other activities could include developing local emergency action plans, clarifying local agencies responsibilities, coordinating local enforcement and providing educational programs for industry, schools and the general public.

In addition, DEQE also provides guidance in a twelve-step police procedure for investigating dumping or transporting violations. The technique is similar to police procedures followed in narcotics cases, whereby all actions are carefully performed and all evidence is collected and preserved in order to establish a legal "chain of custody" between the substance and the violator. These steps include:

1) know the hazardous waste,

2) examine the barrels,

3) if there is probable cause to believe the driver is transportating hazardous waste, request to see the license to transport,

4) if he does not have a license it is a crime -- place the driver under arrest,

5) if there is probable cause that a crime is being committed, search the driver,

6) have the truck towed to a safe place,

7) after seizure, ask the district attorney to issue a court order impounding the vehicle or a search warrant,

8) contact DEQE immediately to have samples collected,

9) photograph the truck from all angles,

10) stay with the DEQE staff when samples are being taken and record all words and numbers on the barrel,

11) when the analysis comes back from the laboratory, and the district attorney is satisfied, ask him to petition the court for an Order of Destruction of the barrels, and

12) remember that the case must be prepared for presentation in court; thus it is necessary to collect and preserve all evidence, establish a chain of custody and ensure that all reports are complete.

Although the focus of this local involvement project in Massachusetts is on hazardous waste, this methodology of providing a liaison and advice to locals could foreseeably be used for toxics-related issues as well. At a time when public awareness and fears of toxics hazards are becoming widespread, resulting at times in seemingly irrational public response to virtually any local development proposal involving chemicals, the development of a statewide network of local coordinators, community response teams and public "investigators" is a timely and sensible approach to an element of integrated toxics management.

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New York - County hazardous waste site search program.

Another example of state and local government cooperation to improve hazardous substances management is the New York County Hazardous Waste Site Search Program. After the Love Canal emergency, New York formed an interagency task force on hazardous waste to investigate past industrial dumping practices in Niagara County. Concurrently, a toxics task force began to identify sites in other counties around the state. Thus, in an effort to coordinate and consolidate these activities, a county-by-county site search and inventory program was mandated in 1979 by the New York Inactive Hazardous Waste Disposal Act.

The county-wide search and resulting inventory must include:

1) each site's location,
2) all available information on ownership
3) period of use
4) nature and quantity of materials disposed
5) soil and water conditions
6) name of industrial generator(s) producing the waste

Two assessments are required for each site: one of environmental problems on or near the site, and one of health problems related to the site. Environmental concerns are evaluated using information about surface water contamination, flora or fauna stress and lack of vegetation, fowl, fish or wildlife at or near the site. The health assessment is the more difficult due to the scarcity of firm environmental and health data. Thus, most of the health assessments are general statements of health concerns determined by the local health officials, based on several considerations: health complaints and inquiries, the proximity of residences or work environments to the site(s), health department data on public and private water supplies in the area, and meteorological data for the area in relation to the contents of the disposal site.

As all counties are not required to follow a strict investigative and analytic procedure, two counties have developed interesting search and inventory techniques. One county compiled a detailed listing of sites through a highly visible *advertising campaign* in which information was solicited from the general public. This was both an attempt to involve the public for educational purposes as well as to tap a potentially useful information source -- those individuals who have lived in the community for a long time and may recall the existence of a long since covered dump site. Another county conducted a detailed *search of historic aerial photographs*. With careful study given to those dating back several decades, numerous sites long ago covered and forgotten were revealed.

This county-by-county approach to inventorying dump sites in the state capitalized on the realization that local groups and citizens are often more aware and knowledgeable than state officials of toxics-related practices and activities occurring within specific areas of the state. In addition, better and more cost efficient results can be obtained when each county develops its own site relevant management and scientific techniques for searching and inventorying.

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Washington - County chemicals directory and emergency resource plan.

In an effort to address the problem of apparently increasing hazardous materials incidents, Thurston County officials surveyed public agencies within the county to determine whether a hazardous materials problem exists. The findings of the survey indicated that a lack of information available on the types and amounts of hazardous materials manufactures, transported and stored in the community existed. In addition, numerous county emergency response officials expressed concern over a lack of prior knowledge regarding potential problems to be faced in responding to a hazardous materials emergency. It was their suggestion that if information of this sort was kept on file for prefire planning, proper emergency response and knowledge of potential problem areas, it would substantially contribute to the reduction of injuries and loss of life and property within Thurston County.

As a result, Thurston County officials requested the assistance of the Department of Emergency Services in coordinating a risk analysis on hazardous materials within the county. The department responded by conducting a survey of seventy-one (71) targeted businesses in the county in an effort to develop a data base of hazardous materials related information for future emergency response planning. The Hazardous Materials Questionnaire requested such information as:

1) the businesses emergency contact person and his/her phone number;

2) the name of any pesticide/herbicide, caustic/corrosive, flammable, explosive, oxidizer, gas or other chemical produced, transported or stored by the business;

3) the average quantity handled per month of the above mentioned hazardous materials;

4) the method(s) of transportation by which hazardous materials are delivered/shipped to the business (truck, train, ship, plan, barge, pipeline);

5) the name of the transporter(s);

6) whether any hazardous materials emergency response experts are employed by the business;

7) what, if any, potential hazardous materials problems appear to exist in Thurston County.

As a result of the survey, the Thurston County Hazardous Materials Analysis was completed and published essentially as a directory of businesses involved in hazardous materials activities in the county, broken out into various categories:

1) hazardous materials handlers in the county,

2) alphabetized listing of chemical classes in use in the county,

3) alphabetized listing of the county businesses utilizing hazardous materials,

4) hazardous materials carriers transporting hazardous materials to retailers in Thurston County,

5) a break out of hazardous materials businesses according to the city/town in the county where it is located,

6) businesses utilizing radioactive materials in the county.

A total of fifty (50) businesses are listed in the directory (fifteen of those being educational institutions), with addresses, phone numbers and types of chemicals utilized and their associated hazards provided. This directory appears not only to provide local emergency response personnel with easily accessible information on hazardous materials present in the county, but also as an example of local and state government cooperation in attempting to improve the overall management structure for hazardous materials control. The state Department of Emergency Services provided staff time and associated expenses and the questionnaire was sent out under state letterhead which may have provided an additional impetus for businesses to complete and return the surveys. Volunteers provided invaluable assistance in conducting the county-wide survey.

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